lenovo

ThinkCentre User Guide

Machine Types: 3026, 3039, 3137, 3149, 3245, 3269, 3319, 3394, 3491, 3627, 3699, 3878, 4972, 5132, 5261, 5297, 5391, 5472, 5485, 5536, 5548, 5567, 5864, and 6213

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ThinkCentre
User Guide

Machine Types: 3026, 3039, 3137, 3149, 3245, 3269, 3319, 3394, 3491, 3627, 3699, 3878, 4972, 5132, 5261, 5297, 5391, 5472, 5485, 5536, 5548, 5567, 5864, and 6213

Note

Before using this information and the product it supports, be sure to read and understand the *ThinkCentre Safety and Warranty Guide* and Appendix A “Notices” on page 55.

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Important safety information

CAUTION:
Before using this manual, be sure to read and understand all the related safety information for this product. Refer to the *ThinkCentre Safety and Warranty Guide* **that you received with this product for the latest safety information. Reading and understanding this safety information reduces the risk of personal injury and or damage to your product.**

If you no longer have a copy of the *ThinkCentre Safety and Warranty Guide*, you can obtain a Portable Document Format (PDF) version from the Lenovo® Support Web site at:
http://www.lenovo.com/support

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Chapter 1. Product overview

This chapter describes the computer features, specifications, preinstalled software programs, and part and connector locations.

Features

This section provides information about the computer features.

System information

The following information covers a variety of models. For information about your specific model, use the Setup Utility program. See Chapter 4 “Using the Setup Utility” on page 41.

Microprocessor

Your computer comes with one of the following microprocessors (internal cache size varies by model type):

- Intel® Core™ i3 microprocessor
- Intel Core i5 microprocessor
- Intel Core i7 microprocessor
- Intel Pentium® microprocessor

Memory

- Supports up to four double data rate 3 dual inline memory modules (DDR3 DIMMs)

Internal drives

- Optical drive
- Serial Advanced Technology Attachment (SATA) internal hard disk drive (installed in some models)

Video subsystem

- Integrated graphics card for a Video Graphics Array (VGA) connector and a DisplayPort connector (not applicable on some models)
- Peripheral Component Interconnect (PCI) Express x16 graphics card slot on the system board for a discrete graphics card

Audio subsystem

- Integrated high-definition (HD) audio
- Audio line-in connector, audio line-out connector, and microphone connector on the rear panel
- Microphone connector and headphone connector on the front panel
- Internal speaker (installed in some models)

Connectivity

- 100/1000 Mbps integrated Ethernet controller
- PCI Fax modem (some models)

System management features

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- Ability to store power-on self-test (POST) hardware test results
- Automatic power-on startup
- Desktop Management Interface (DMI)
- Intel Active Management Technology (AMT) (available on some models)
- Intel Matrix Storage Manager
- Preboot Execution Environment (PXE)
- Secure Managed Client (SMC) (some models)
- System Management (SM) Basic Input/Output System (BIOS) and SM software
- Wake on LAN
- Wake on Ring
- Windows Management Instrumentation (WMI)

Input/Output (I/O) features

- 9-pin serial port (one standard and one optional)
- Eight Universal Serial Bus (USB) connectors (two on the front panel and six on the rear panel)
- Ethernet connector
- One DisplayPort connector (not applicable on some models)
- One VGA monitor connector (not applicable on some models)
- One Personal System/2® (PS/2®) keyboard connector (optional)
- One PS/2 mouse connector (optional)
- Three audio connectors on the rear panel (audio line-in connector, audio line-out connector, and microphone connector)
- Two audio connectors on the front panel (microphone connector and headphone connector)

For more information, see “Locating connectors on the front of your computer” on page 6 and “Locating connectors on the rear of your computer” on page 7.

Expansion

- One hard disk drive bay
- One optical drive bay
- One PCI card slot
- One PCI Express x16 graphics card slot

Power supply

- 240-watt auto-sensing power supply

Security features

- Computrace
- Cover presence switch (also called intrusion switch)
- Enabling or disabling a device
- Enabling or disabling USB connectors individually
- Hard disk drive password
- Keyboard with fingerprint reader (shipped with some models)

- Power-on password (POP) and Administrator Password for BIOS access
- Startup sequence control
- Startup without keyboard or mouse
- Support for an integrated cable lock (Kensington lock)
- Trusted Platform Module (TPM)

Preinstalled software programs

Your computer is preinstalled with some software programs to help you work more easily and securely. For more information, see “Software overview” on page 4.

Preinstalled operating system

Your computer is preinstalled with one of the following operating systems:

- Microsoft® Windows® 7
- Microsoft Windows Vista®

Operating system(s), certified or tested for compatibility[1] (varies by model type)

- Linux®

Specifications

This section lists the physical specifications for your computer.

1. The operating system(s) listed here are being certified or tested for compatibility at the time this publication goes to press. Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this manual. This list is subject to change. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system vendor.

Dimensions

Width: 317 mm (12.48 inches)

Height: 99 mm (3.9 inches)

Depth: 355 mm (13.98 inches)

Weight

Maximum configuration as shipped: 7.5 kg (16.53 lbs)

Environment

- Air temperature:

  Operating: 10°C to 35°C (50°F to 95°F)

  Non-operating: -40°C to 60°C (-40°F to 140°F)

  Non-operating: -10°C to 60°C (14°F to 140°F) (without package)
- Humidity:

  Operating: 20% to 80% (non-condensing)

  Non-operating: 20% to 90% (non-condensing)
- Altitude:

  Operating: -50 to 10 000 ft (-15.2 to 3 048 m)

  Non-operating: -50 to 35 000 ft (-15.2 to 10 668 m)

Electrical input

- Input voltage:
  - Low range:

    Minimum: 100 V ac

    Maximum: 127 V ac

    Input frequency range: 50 to 60 Hz

    Voltage-selection switch setting: 115 V ac
  - High range:

    Minimum: 200 V ac

    Maximum: 240 V ac

    Input frequency range: 50 to 60 Hz

    Voltage-selection switch setting: 230 V ac

Software overview

This section describes the software preinstalled on the computers that have an internal hard disk drive and an operating system from Lenovo.

Software provided by Lenovo

The following software programs are provided by Lenovo to help you improve productivity and reduce the cost associated with maintaining your computer. Software programs provided with your computer might vary depending on your computer model type and preinstalled operating system.

Lenovo ThinkVantage Tools

The Lenovo ThinkVantage® Tools program guides you to a host of information sources and provides easy access to various tools to help you work more easily and securely. For more information, see “Lenovo ThinkVantage Tools” on page 51.

Note: The Lenovo ThinkVantage Tools program is only available on computers with the Windows 7 operating system from Lenovo.

ThinkVantage Productivity Center

The ThinkVantage Productivity Center program guides you to a host of information and tools to help you set up, understand, maintain, and enhance your computer.

Note: The ThinkVantage Productivity Center program is only available on computers preinstalled with the Windows Vista operating system from Lenovo.

Lenovo Welcome

The Lenovo Welcome program introduces you to some innovative built-in features of Lenovo and guides you through a few important setup tasks to help you make the most of your computer.

ThinkVantage Rescue and Recovery

The ThinkVantage Rescue and Recovery® program is a one button recovery and restore solution that includes a set of self recovery tools to help users diagnose computer problems, get help, and recover from system crashes quickly, even if the primary operating system will not start.

ThinkVantage Client Security Solution

The ThinkVantage Client Security Solution program is available on select Lenovo computers. It helps protect your information, including vital security information like passwords, encryption keys, and electronic credentials, while guarding against unauthorized user access to data.

Note: The ThinkVantage Client Security Solution program is only available on computers preinstalled with the Windows Vista operating system from Lenovo.

Password Manager

The Password Manager program helps you automatically capture and fill in authentication information for Windows applications and Web sites.

Note: The Password Manager program is only available on computers preinstalled with the Windows 7 operating system from Lenovo.

Power Manager

The Power Manager program provides convenient, flexible, and complete power management for your ThinkCentre® computer. By using the Power Manager program, you can adjust your power settings to achieve the best balance between system performance and power saving.

Product Recovery

The Product Recovery program enables you to restore the contents of the hard disk drive to the factory default settings.

Fingerprint Software

The integrated fingerprint reader provided on some keyboards enables you to enroll your fingerprint and associate it with your power-on password, hard disk drive password, and Windows password. As a result, fingerprint authentication can replace passwords and enable simple and secure user access. A fingerprint reader keyboard is available with select computers or can be purchased for computers that support this option.

Lenovo ThinkVantage Toolbox

The Lenovo ThinkVantage Toolbox program helps you maintain your computer, improve computing security, diagnose computer problems, get familiar with the innovative technologies provided by Lenovo, and get more information about your computer. See “Lenovo ThinkVantage Toolbox” on page 48 for detailed information.

PC-Doctor for Rescue and Recovery

The PC-Doctor for Rescue and Recovery diagnostic program is preinstalled on your hard disk drive. It is part of the Rescue and Recovery workspace on each Lenovo computer to diagnose hardware problems and report operating-system-controlled settings that can cause hardware failures. Use the PC-Doctor for Rescue and Recovery diagnostic program if you are unable to start the Windows operating system. See “PC-Doctor for Rescue and Recovery” on page 49 for more information.

Adobe Reader

The Adobe Reader program is a tool used to view, print, and search PDF documents.

See “Online Books folder” on page 51 for more information about accessing the online books and the Lenovo Web site.

Antivirus software

Your computer comes with antivirus software that you can use to detect and eliminate viruses. Lenovo provides a full version of antivirus software on your hard disk drive with a free 30-day subscription. After 30 days, you must renew the license to continue receiving the antivirus program updates.

Locations

Locating connectors on the front of your computer

Front connector locations shows the locations of the connectors on the front of your computer.

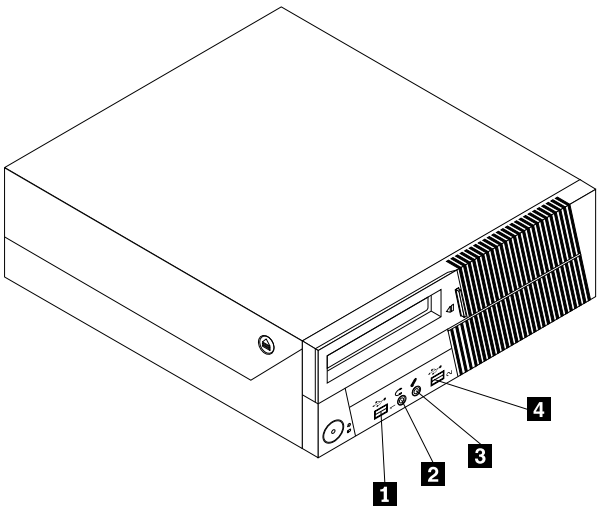

Figure 1. Front connector locations

1 USB connector
2 Headphone connector
3 Microphone connector
4 USB connector

Locating connectors on the rear of your computer

Rear connector locations shows the locations of the connectors on the rear of your computer. Some connectors on the rear of your computer are color-coded to help you determine where to connect the cables on your computer.

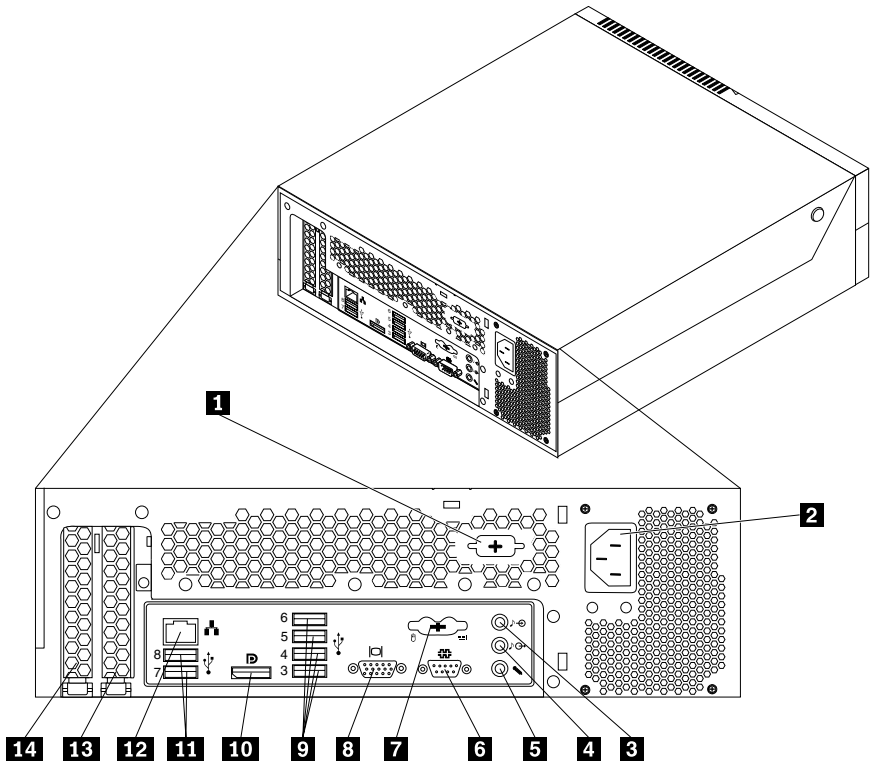

Figure 2. Rear connector locations

1 Optional serial port
2 Power cord connector
3 Audio line-in connector
4 Audio line-out connector
5 Microphone connector
6 Serial port
7 PS/2 keyboard and mouse connectors (optional)
8 VGA monitor connector (not applicable on some models)
9 USB connectors (4)
10 DisplayPort connector (not applicable on some models)
11 USB connectors (2)
12 Ethernet connector
13 PCI Express x16 graphics card slot
14 PCI card slot

Connector	Description
Audio line-in connector	Used to receive audio signals from an external audio device, such as a stereo system. When you attach an external audio device, a cable is connected between the audio line-out connector of the device and the audio line-in connector of the computer.
Audio line-out connector	Used to send audio signals from the computer to external devices, such as powered stereo speakers (speakers with built-in amplifiers), headphones, multimedia keyboards, or the audio line-in connector on a stereo system or other external recording device.

Connector	Description
DisplayPort connector	Used to attach a high-performance monitor, a direct-drive monitor, or other devices that use a DisplayPort connector.
Ethernet connector	Used to attach an Ethernet cable for a local area network (LAN). **Note:** To operate the computer within FCC Class B limits, use a Category 5 Ethernet cable.
Microphone connector	Used to attach a microphone to your computer when you want to record sound or if you use speech-recognition software.
Serial port	Used to attach an external modem, a serial printer, or other devices that use a 9-pin serial port.
PS/2 keyboard connector (optional)	Used to attach a keyboard that uses a PS/2 keyboard connector.
PS/2 mouse connector (optional)	Used to attach a mouse, a trackball, or other pointing devices that use a PS/2 mouse connector.
USB connector	Used to attach a device that requires a USB connector, such as a USB keyboard, a USB mouse, a USB scanner or a USB printer. If you have more than eight USB devices, you can purchase a USB hub, which you can use to connect additional USB devices.
VGA monitor connector	Used to attach a VGA monitor or other devices that use a VGA monitor connector.

Locating components

Figure 3 “Component locations” on page 8 shows the locations of the various components in your computer. To open the computer cover, see “Opening the computer cover” on page 12.

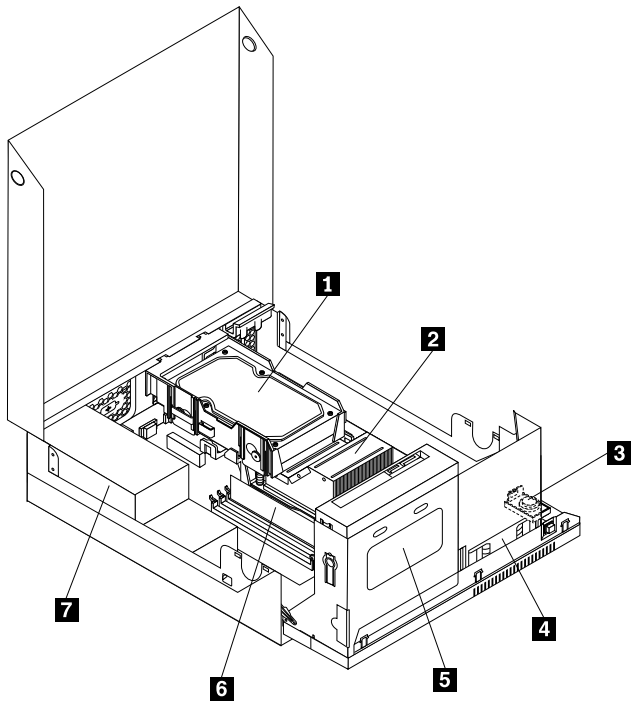

Figure 3. Component locations

1 Hard disk drive (installed in some models)

2 Heat sink

3 Internal speaker (installed in some models)

4 System fan assembly

5 Optical drive

6 Memory module

7 Power supply assembly

Locating parts on the system board

Figure 4 “System board part locations” on page 9 shows the locations of the parts on the system board.

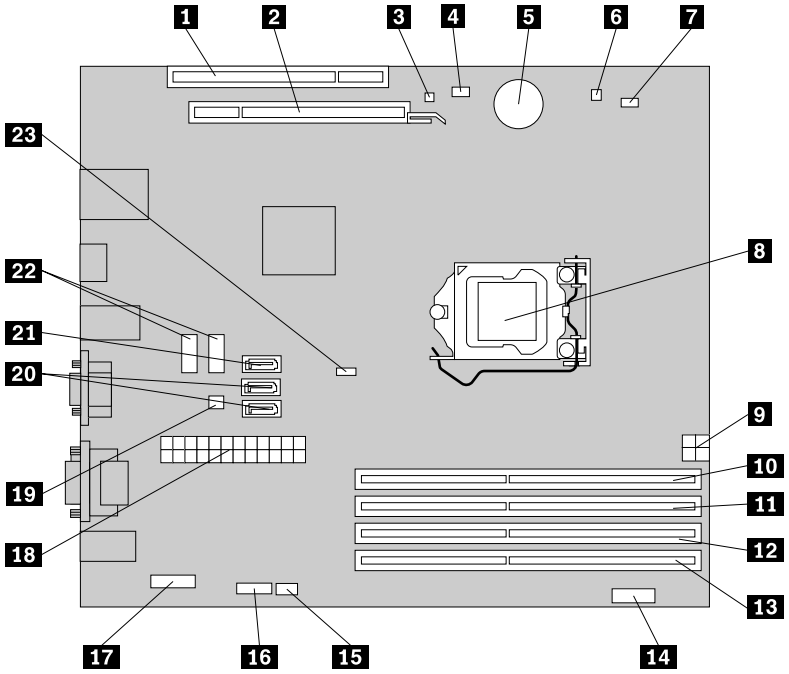

Figure 4. System board part locations

1 PCI card slot

2 PCI Express x16 graphics card slot

3 Internal speaker connector

4 Cover presence switch connector (Intrusion switch connector)

5 Battery

6 Thermal sensor connector

7 Microprocessor fan connector

8 Microprocessor

9 4-pin power connector

10 Memory slot 2

11 Memory slot 1

12 Memory slot 4

13 Memory slot 3

14 Front panel connector

15 PS/2 keyboard and mouse connector

16 Serial (COM) connector

17 Front audio connector

18 24-pin power connector

19 Power fan connector

20 SATA connectors (2)

21 eSATA connector

22 Front USB connectors (2)

23 Clear CMOS (Complementary Metal Oxide Semiconductor) /Recovery jumper

Locating internal drives

Internal drives are devices that your computer uses to read and store data. You can add drives to your computer to increase storage capacity and enable your computer to read other types of media. Your computer comes with the following factory-installed drives:

- A 3.5-inch hard disk drive in bay 1 (installed in some models)
- An optical drive in bay 2

Internal drives are installed in bays. In this manual, the bays are referred to as bay 1, bay 2, and so on. Figure 5 “Drive bay locations” on page 10 shows the locations of the drive bays.

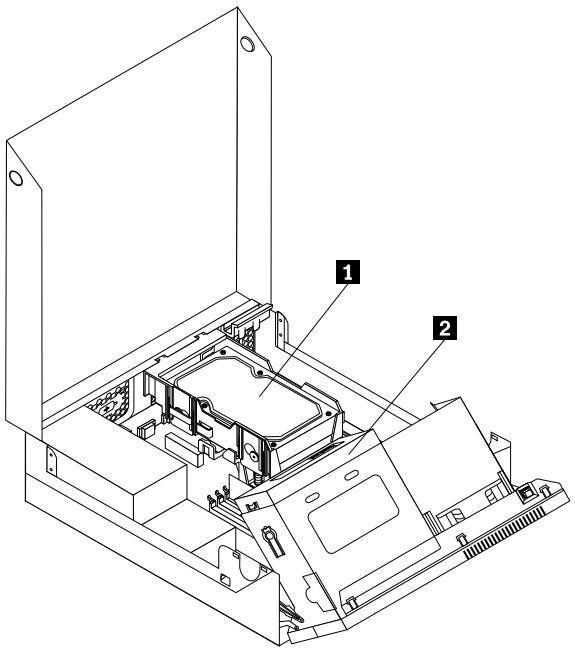

Figure 5. Drive bay locations

The following list describes the type and size of the drive that you can install in each bay:

1 Bay 1 - Maximum height: 26.1 mm (1.03 inches)	3.5-inch hard disk drive
2 Bay 2 - Maximum height: 41.6 mm (1.64 inches)	Optical drive

Chapter 2. Installing or replacing hardware

This chapter provides instructions on how to install or replace hardware for your computer.

Handling static-sensitive devices

Do not open the static-protective package containing the new part until the defective part has been removed from the computer and you are ready to install the new part. Static electricity, although harmless to you, can seriously damage computer components and parts.

When you handle parts and other computer components, take these precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle parts and other computer components carefully. Handle PCI cards, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts and other computer components.
- Before you replace a new part, touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the new part from the static-protective packaging, and install it directly in the computer without setting the part down. When this is not possible, place the static-protective package that the part came in on a smooth, level surface and place the part on it.
- Do not place the part on the computer cover or other metal surface.

Installing or replacing hardware

This section provides instructions on how to install or replace hardware for your computer. You can expand the capabilities of your computer and maintain your computer by installing or replacing hardware.

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

Notes:

1. Use only computer parts provided by Lenovo.
2. When installing or replacing an option, use the appropriate instructions in this section along with the instructions that come with the option.

Installing external options

You can connect external options to your computer, such as external speakers, a printer, or a scanner. For some external options, you must install additional software in addition to making the physical connection. When installing an external option, see “Locating connectors on the front of your computer” on page 6 and “Locating connectors on the rear of your computer” on page 7 to identify the required connector. Then, use the instructions that come with the option to help you make the connection and install any software or device drivers that are required for the option.

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Opening the computer cover

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to open the computer cover.

CAUTION:
Turn off the computer and wait three to five minutes to let the computer cool before opening the computer cover.

To open the computer cover, do the following:

1. Remove any media from the drives and turn off all attached devices and the computer.
2. Disconnect all power cords from electrical outlets.
3. Disconnect the power cords, Input/Output cables, and any other cables that are connected to the computer. See “Locating connectors on the front of your computer” on page 6 and “Locating connectors on the rear of your computer” on page 7.
4. Remove any locking device that secures the computer cover, such as an integrated cable lock. See “Integrated cable lock” on page 33.
5. Press the cover-release buttons on the sides of the computer and pivot the computer cover upward.

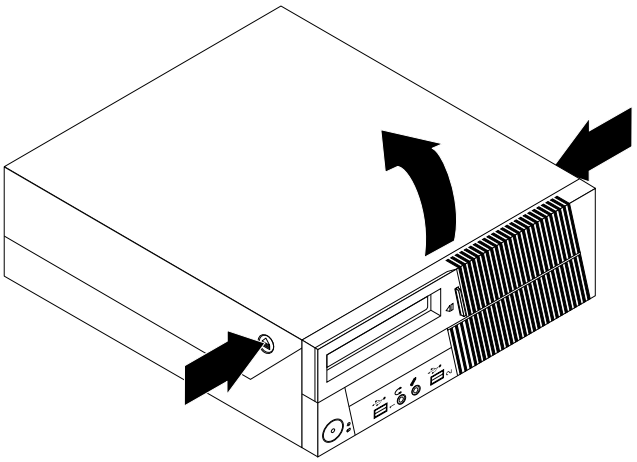


Figure 6. Opening the computer cover

Accessing the system board components and drives

This section provides instructions on how to access the system board components and drives.

To access the system board components and drives, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Pivot the optical drive bay assembly upward to access the internal components. On some models, you might need to remove the hard disk drive to access some internal components. See “Replacing the hard disk drive” on page 18.

Notes:

a. Make sure you note the locations of any cables that you disconnect from the drives or the system board.

b. Make sure the hard disk drive assembly is in the latched down position before closing the computer cover to prevent damage to the hard disk drive.

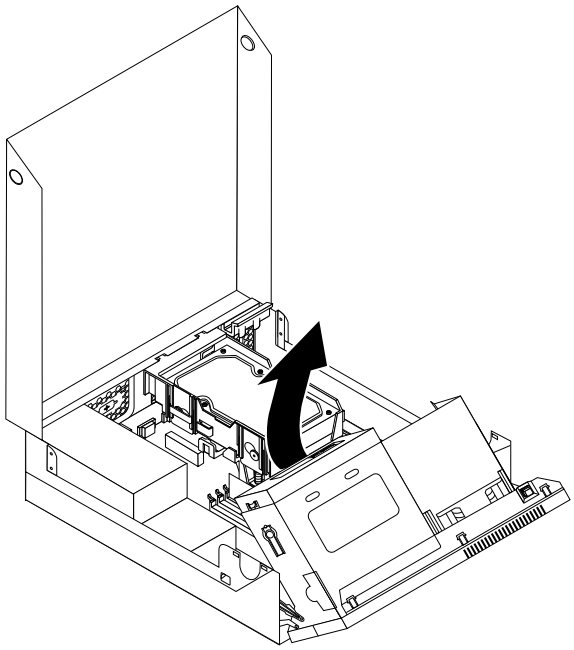


Figure 7. Pivoting the optical drive bay assembly

Installing or replacing a memory module

Attention:
Do not open your computer or attempt any repair before reading and understanding the "Important safety information" in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to install or replace a memory module.

Your computer has four slots for installing or replacing DDR3 DIMMs that provide up to a maximum of 16 GB system memory. When installing or replacing a memory module, use the following guidelines:

- Use 1 GB, 2 GB, or 4 GB DDR3 DIMMs in any combination up to a maximum of 16 GB.
- Install memory modules in the sequence of DIMM 1, DIMM 3, DIMM 2, and DIMM 4. See "Locating parts on the system board" on page 9.

To install or replace a memory module, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See "Opening the computer cover" on page 12.
3. Pivot the optical drive bay assembly upward to gain access to the memory slots. See "Accessing the system board components and drives" on page 12.
4. Locate the memory slots. See "Locating parts on the system board" on page 9.

5. Remove any parts that might prevent access to the memory slots.
6. Open the retaining clips.

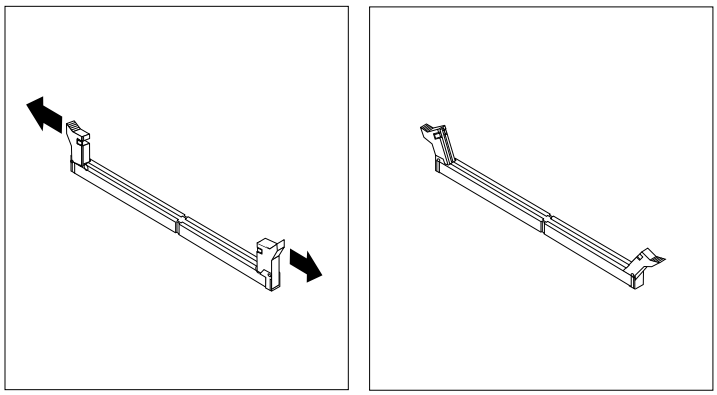


Figure 8. Opening the retaining clips

If you are replacing an old memory module, open the retaining clips and gently pull the memory module out of the memory slot.

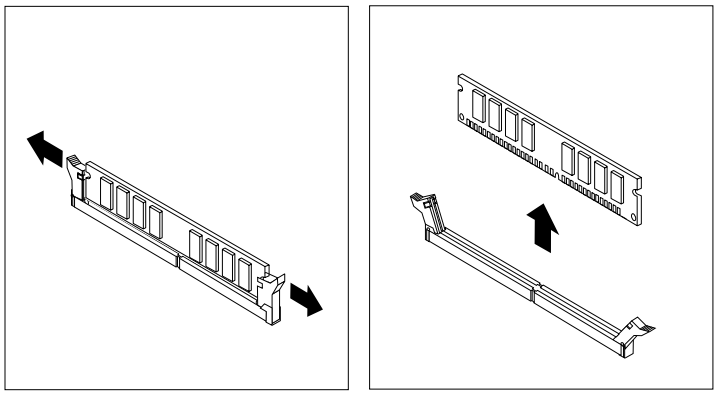


Figure 9. Removing a memory module

7. Position the new memory module over the memory slot. Make sure that the notch **1** on the memory module aligns correctly with the slot key **2** on the system board. Push the memory module straight down into the slot until the retaining clips close.

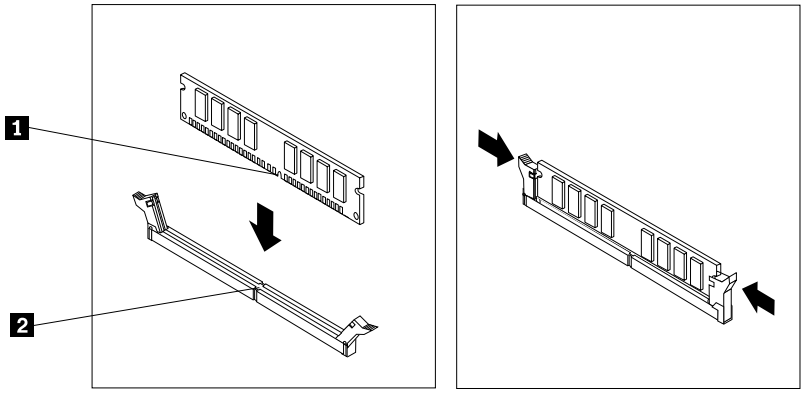


Figure 10. Installing a memory module

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Installing or replacing a PCI card

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to install or replace a PCI card. Your computer has one standard PCI card slot and one PCI Express x16 graphics card slot.

To install or replace a PCI card, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Rotate the PCI card retainer to the open position.
4. If you are installing a PCI card, remove the appropriate metal slot cover. If you are replacing an old PCI card, grasp the old card that is currently installed and gently pull it out of the slot.

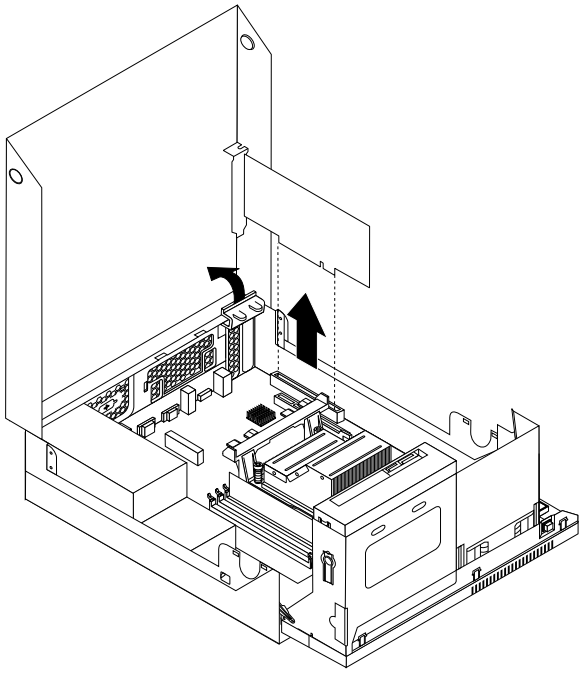
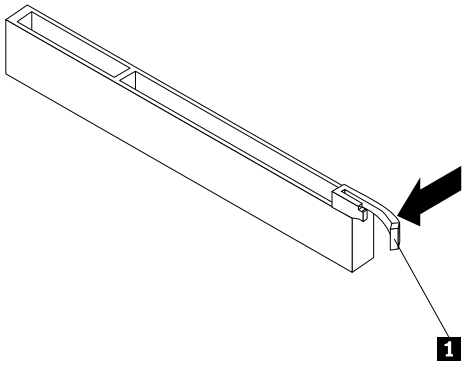


Figure 11. Removing a PCI card

Notes:

a. The card fits tightly into the card slot. If necessary, alternate moving each side of the card a small amount until it is removed from the card slot.

b. If the card is held in place by a retaining latch, press the card retaining latch **1** as shown to disengage the latch. Grasp the card and gently pull it out of the slot.



5. Remove the new PCI card from its static-protective package.
6. Install the new card into the appropriate card slot on the system board and rotate the card retainer to the closed position. See “Locating parts on the system board” on page 9.

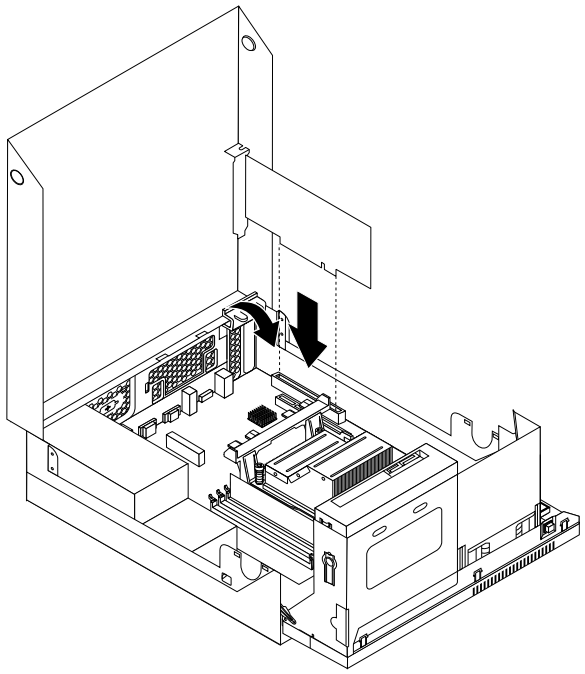


Figure 12. Installing the PCI card

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to "Completing the parts replacement" on page 32.

Replacing the battery

Attention:
Do not open your computer or attempt any repair before reading and understanding the "Important safety information" in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

Your computer has a special type of memory that maintains the date, time, and settings for built-in features, such as parallel-port assignments (configuration). A battery keeps this information active when you turn off the computer.

The battery normally requires no charging or maintenance throughout its life; however, no battery lasts forever. If the battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the computer.

Refer to the "Lithium battery notice" in the *ThinkCentre Safety and Warranty Guide* for information about replacing and disposing of the battery.

To replace the battery, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See "Opening the computer cover" on page 12.
3. Locate the battery. See "Locating parts on the system board" on page 9.
4. Remove the old battery.

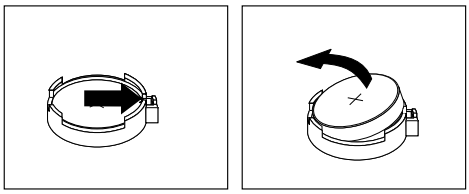


Figure 13. Removing the old battery

5. Install a new battery.

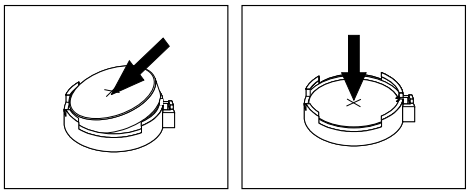


Figure 14. Installing a new battery

6. Close the computer cover and connect the cables. See “Completing the parts replacement” on page 32.

   Note: When the computer is turned on for the first time after replacing the battery, an error message might be displayed. This is normal after replacing the battery.
7. Turn on the computer and all attached devices.
8. Use the Setup Utility program to set the date, time, and any passwords. See Chapter 4 “Using the Setup Utility” on page 41.

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Replacing the hard disk drive

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the hard disk drive if your computer has one. For computer models that do not have an internal hard disk drive and use a remote hard disk drive accessed through the SMC - Storage Array, contact your network or storage administrator.

To replace the hard disk drive, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. You might need to pivot the optical drive bay assembly upward to gain easier access to the hard disk drive. See “Accessing the system board components and drives” on page 12.
4. Locate the hard disk drive. See “Locating components” on page 8.

5. Push the release button 1 of the hard disk drive bracket as shown and then lift the hard disk drive bracket up from the heat sink.

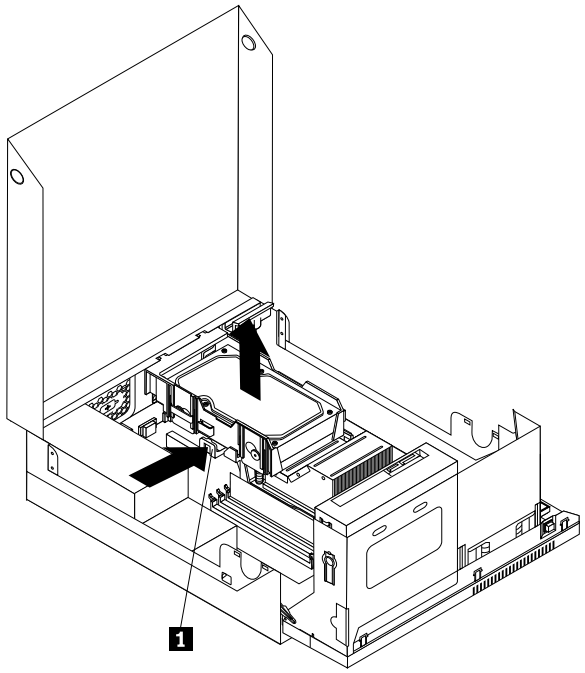


Figure 15. Removing the hard disk drive

6. Disconnect the signal cable and the power cable from the hard disk drive to completely remove the hard disk drive from the chassis.
7. Flex the sides of the bracket to remove the hard disk drive from the bracket.
8. To install a new hard disk drive into the bracket, flex the bracket and align pin 1, pin 2, pin 3, and pin 4 on the bracket with the corresponding holes in the hard disk drive.

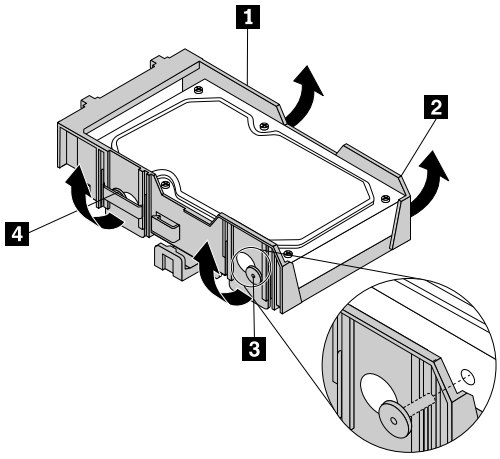


Figure 16. Installing the hard disk drive into the bracket

Important: Do not touch the circuit board on the bottom of the hard disk drive.

9. Connect the signal cable and the power cable to the new hard disk drive.

10. Insert the two retaining clips **1** of the hard disk drive bracket into the corresponding holes in the chassis, and then pivot the hard disk drive and bracket downwards until the hard disk drive bracket snaps into position.

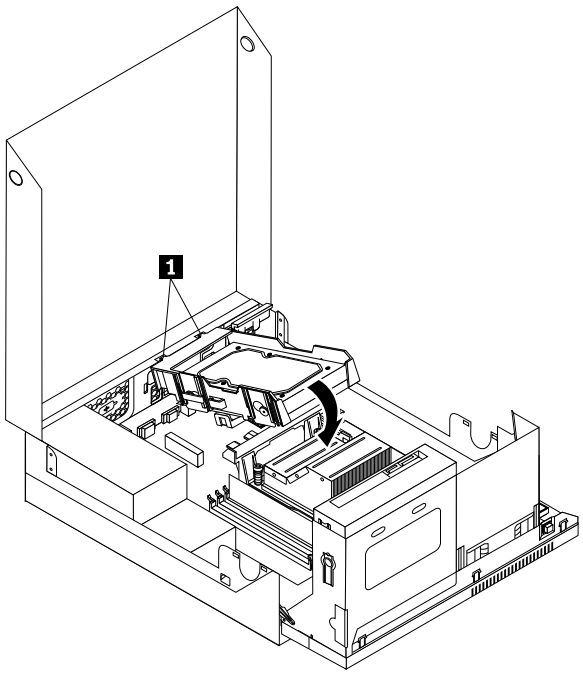


Figure 17. Installing the hard disk drive

11. Go to “Completing the parts replacement” on page 32.

Replacing the optical drive

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the optical drive.

To replace the optical drive, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Pivot the optical drive bay assembly upward to gain easy access to the optical drive. See “Accessing the system board components and drives” on page 12.
4. Disconnect the signal cable and the power cable from the rear of the optical drive.
5. Press the optical drive lock **1** and slide the optical drive out of the rear of the drive bay assembly.

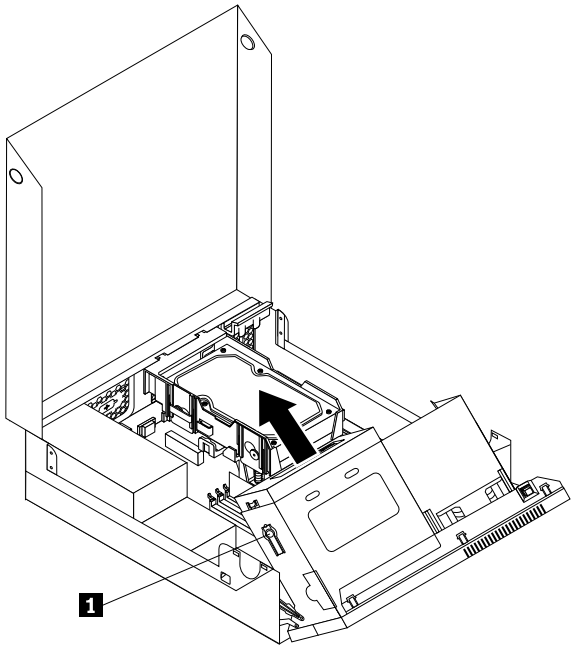


Figure 18. Removing the old optical drive

6. Install the optical drive retainer on the side of the new optical drive.

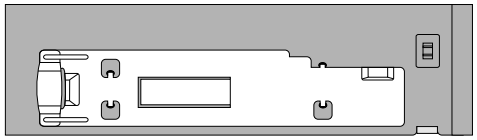


Figure 19. Installing the optical drive retainer

7. Slide the new optical drive into the drive bay until it snaps into position.

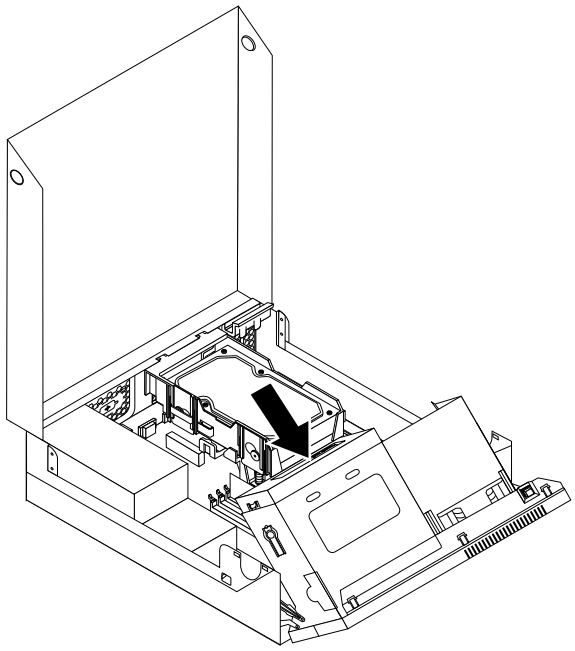


Figure 20. Installing a new optical drive

8. Connect the signal cable and the power cable to the rear of the optical drive.

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Replacing the power supply assembly

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the power supply assembly.

To replace the power supply assembly, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Disconnect the power cords, Input/Output cables, and any other cables that are connected to the computer.
3. Remove the four screws at the rear of the chassis that secure the power supply assembly.

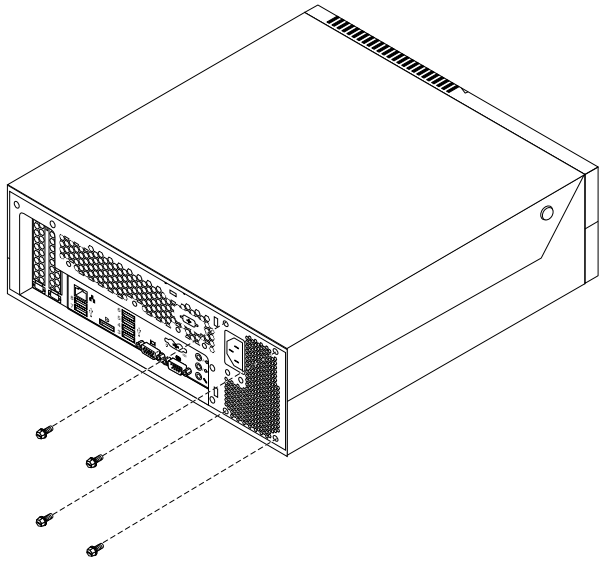


Figure 21. Removing the retaining screws for the power supply assembly

4. Open the computer cover. See “Opening the computer cover” on page 12.
5. Pivot the optical drive bay assembly upward to gain access to the power supply assembly. See “Accessing the system board components and drives” on page 12.
6. Disconnect the power supply assembly cables from all drives and from the power connectors **1** and **2** on the system board.

   Note: You might need to remove the hard disk drive to gain easy access to the power connector **2**. See “Replacing the hard disk drive” on page 18.

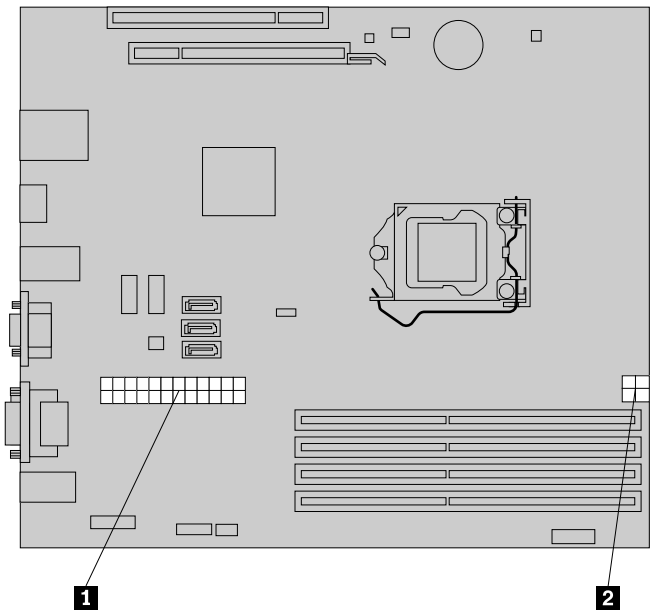


Figure 22. Power connectors on the system board

7. Release the power supply assembly cables from the cable clips and ties in the chassis.
8. Slide the power supply assembly to the front of the computer and then lift it out of the chassis.

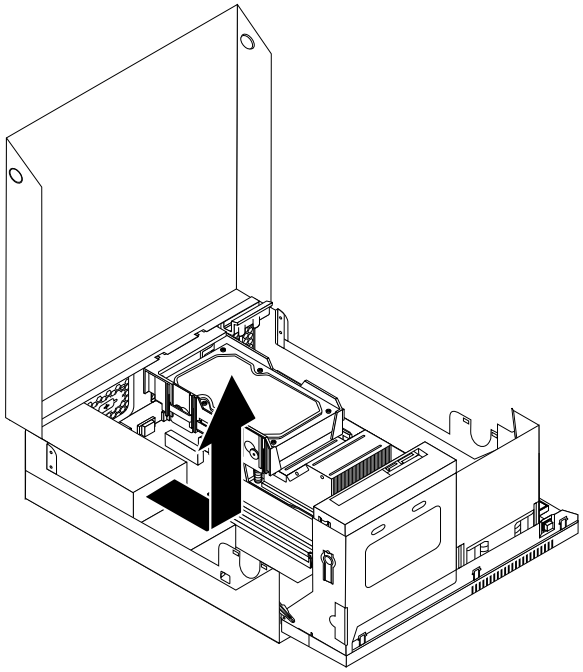


Figure 23. Removing the power supply assembly

9. Install the new power supply assembly into the chassis so that the screw holes in the new power supply assembly align with those in the chassis.
10. Install and tighten the four screws to secure the power supply assembly.

    Note: Use only the screws provided by Lenovo.
11. Reconnect all the power supply assembly cables to the system board and each of the drives.
12. Secure the power supply assembly cables with the cable clips and ties in the chassis.

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Replacing the heat sink

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the heat sink.

CAUTION:

The heat sink might be very hot. Turn off the computer and wait three to five minutes to let the computer cool before opening the computer cover.

To replace the heat sink, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Pivot the optical drive bay assembly upward. See “Accessing the system board components and drives” on page 12.
4. Remove the hard disk drive to access the heat sink. See “Replacing the hard disk drive” on page 18.
5. Carefully remove the four screws **1** that secure the heat sink to the system board.

   Note: Carefully remove the four screws from the system board to avoid any possible damage to the system board. The four screws cannot be removed from the heat sink.

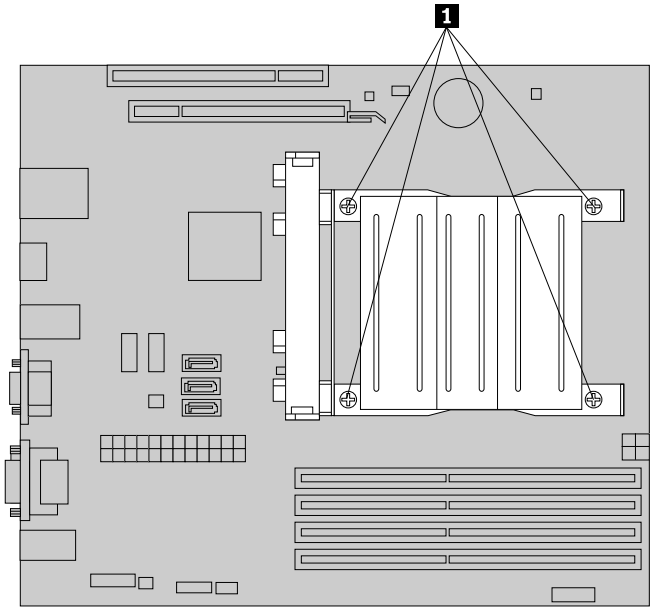


Figure 24. Removing the heat sink

6. Carefully lift the heat sink off the system board.

   Notes:

   a. You might have to gently twist the heat sink to free it from the microprocessor.

   b. Do not touch the thermal grease while handling the heat sink.
7. Position the new heat sink on the system board so that the four screws are aligned with the holes on the system board.
8. Alternate tightening each screw a small and equal amount until the heat sink is secured to the system board. Do not over-tighten the screws.

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Replacing the front audio and USB assembly

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the front audio and USB assembly.

To replace the front audio and USB assembly, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Pivot the optical drive bay assembly upward to gain access to the front audio and USB assembly. See “Accessing the system board components and drives” on page 12.
4. Locate the front audio and USB assembly.
5. Disconnect the front audio and USB assembly cables from the system board. See “Locating parts on the system board” on page 9.

   Note: Make sure you note the locations of the cables when you disconnect the cables from the system board.
6. Remove the screw that secures the front audio and USB assembly to the chassis.

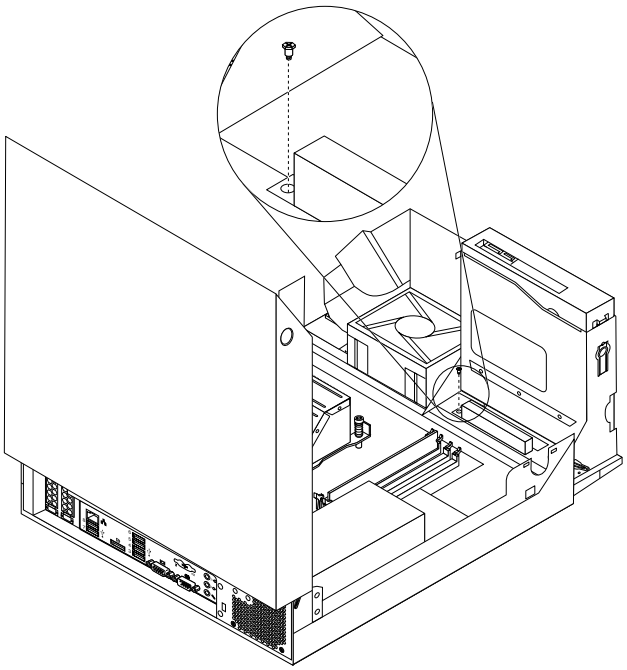


Figure 25. Removing the securing screw of the front audio and USB assembly

7. Remove the front audio and USB assembly from the chassis.
8. Install a new front audio and USB assembly into the chassis and align the screw hole in the front audio and USB assembly with the hole in the chassis.
9. Install the screw to secure the new front audio and USB assembly to the chassis.

10. Reconnect the front audio and USB assembly cables to the front audio connector and the front USB connector on the system board. See “Locating parts on the system board” on page 9.

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Replacing the system fan

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the system fan.

To replace the system fan, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Remove the front bezel by releasing the three plastic tabs and pivoting the front bezel outward.

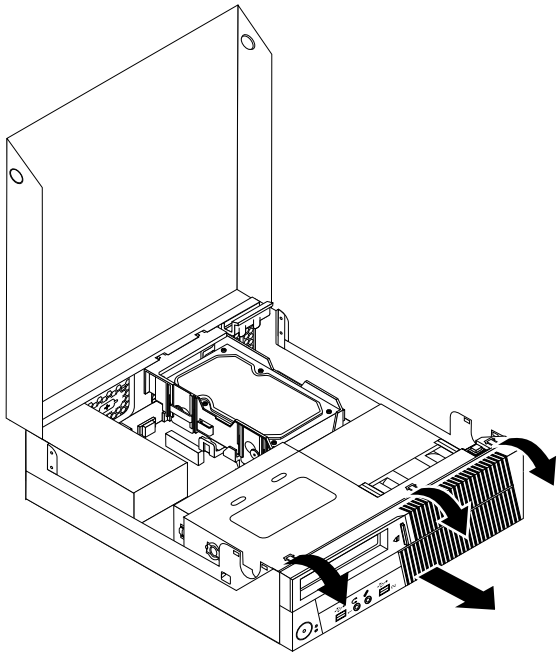


Figure 26. Removing the front bezel

4. Pivot the optical drive bay assembly upward. See “Accessing the system board components and drives” on page 12.
5. Locate the system fan. See “Locating components” on page 8.
6. Disconnect the system fan cable from the microprocessor fan connector on the system board. See “Locating parts on the system board” on page 9.
7. Release the four tabs on the bottom of the system fan as shown, and then lift the system fan straight up to completely remove it from the chassis.

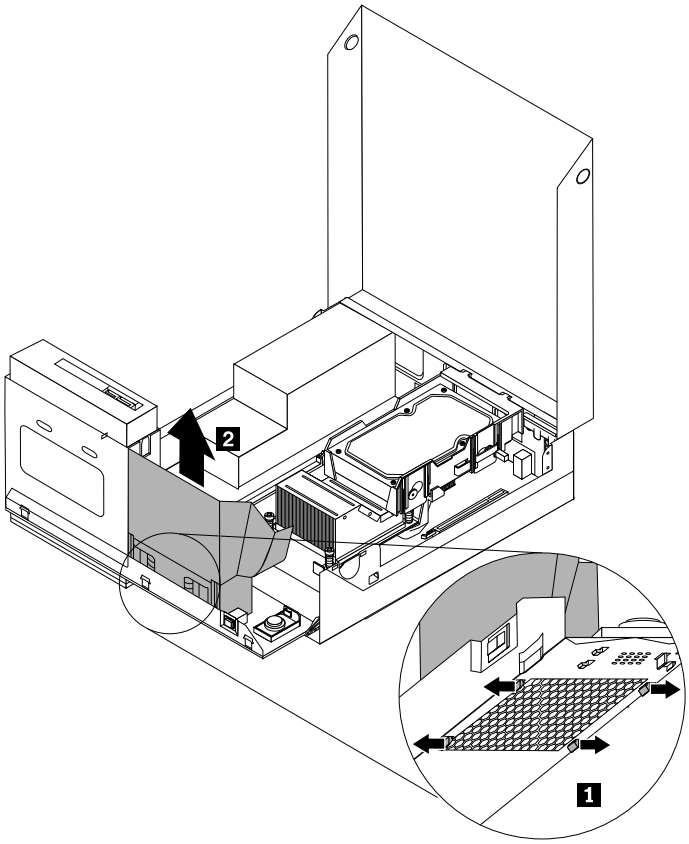


Figure 27. Removing the system fan

8. Align the four tabs on the bottom of the new system fan with the corresponding holes in the chassis, and push the new system fan straight down until it snaps into position.
9. Connect the system fan cable to the microprocessor fan connector on the system board. See “Locating parts on the system board” on page 9.
10. To reinstall the front bezel, align the three tabs on the front bezel with the corresponding holes in the chassis and pivot the front bezel inwards until it snaps into position.

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Replacing the internal speaker

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the internal speaker.

Note: Not all computers have the internal speaker.

To replace the internal speaker, do the following:

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Remove the front bezel by releasing the three plastic tabs and pivoting the front bezel outward.

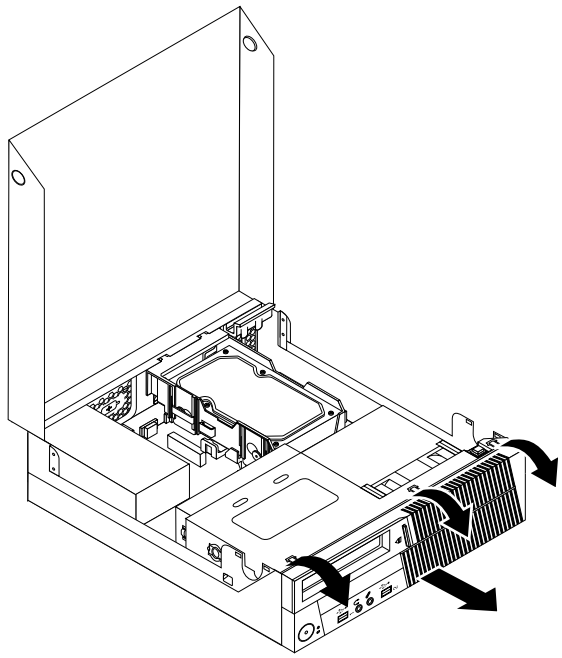


Figure 28. Removing the front bezel

4. Pivot the optical drive bay assembly upward to gain access to the internal speaker. See “Accessing the system board components and drives” on page 12.
5. Locate the internal speaker. See “Locating components” on page 8.
6. Disconnect the internal speaker cable and the thermal sensor cable from the internal speaker connector and the thermal sensor connector on the system board. See “Locating parts on the system board” on page 9.
7. Push the two tabs **1** on the bottom of the internal speaker as shown to release the internal speaker, and then lift the internal speaker up to completely remove it from the chassis.

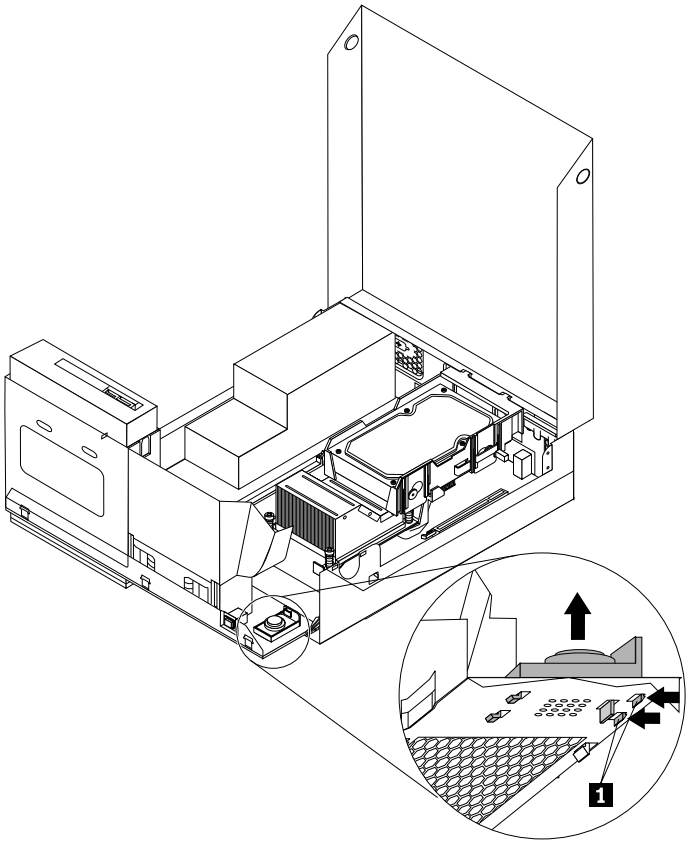


Figure 29. Removing the internal speaker

8. Remove the attached thermal sensor cable from the old internal speaker and install it on the new internal speaker.
9. Insert the two tabs **2** on the bottom of the new internal speaker into the corresponding holes in the chassis, and push the speaker straight down until the other two tabs **1** snap into position.

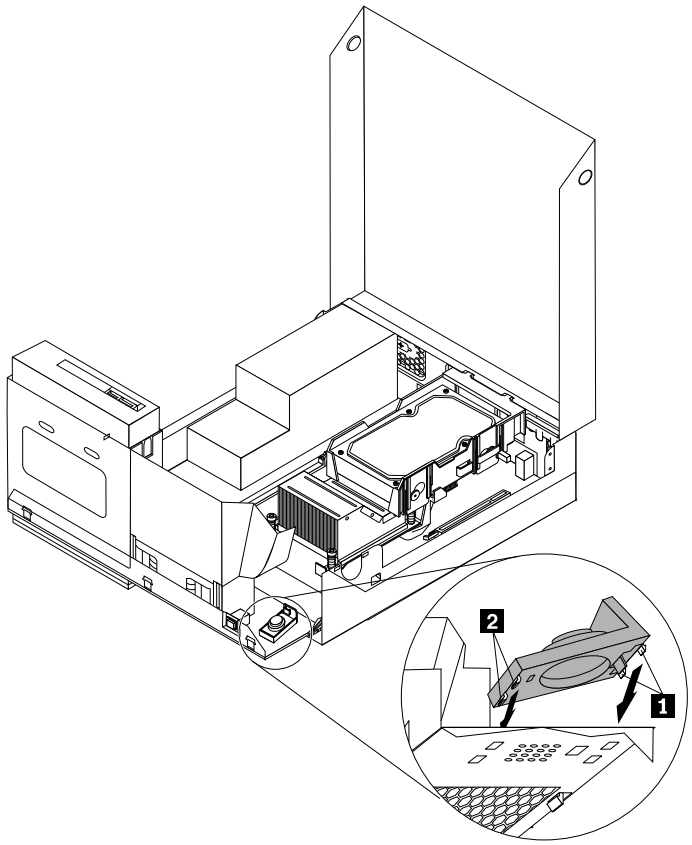


Figure 30. Installing the new internal speaker

10. Reconnect the internal speaker cable and the thermal sensor cable to the system board. See “Locating parts on the system board” on page 9.
11. To reinstall the front bezel, align the three tabs on the front bezel with the corresponding holes in the chassis and pivot the front bezel inwards until it snaps into position.

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Replacing the keyboard or mouse

Attention:
Do not open your computer or attempt any repair before reading and understanding the “Important safety information” in the *ThinkCentre Safety and Warranty Guide* that came with your computer. To obtain a copy of the *ThinkCentre Safety and Warranty Guide*, go to:
http://www.lenovo.com/support

This section provides instructions on how to replace the keyboard or mouse.

To replace the keyboard or mouse, do the following:

1. Remove any media from the drives. Then, turn off all attached devices and the computer.
2. Disconnect all power cords from electrical outlets.
3. Disconnect the old keyboard cable or mouse cable from the computer.

4. Connect a new keyboard or mouse to one of the USB connectors on the computer. Depending on where you want to connect the new keyboard or mouse, see “Locating connectors on the front of your computer” on page 6 or “Locating connectors on the rear of your computer” on page 7.

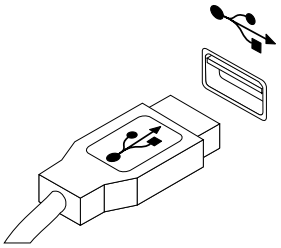


Figure 31. Connecting a new keyboard or mouse

What to do next:

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 32.

Completing the parts replacement

After completing the installation or replacement for all parts, you need to close the computer cover and reconnect cables. Depending on the parts you installed or replaced, you might need to confirm the updated information in the Setup Utility program. Refer to Chapter 4 “Using the Setup Utility” on page 41.

To close the computer cover and reconnect cables to your computer, do the following:

1. Make sure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer. See “Locating components” on page 8 for the locations of various components in your computer.
2. If you have removed the front bezel, reinstall it. To reinstall the front bezel, align the three tabs on the front bezel with the corresponding holes in the chassis and pivot the front bezel inwards until it snaps into position.
3. Make sure that the cables are routed correctly. Keep cables clear of the hinges and sides of the computer chassis to avoid interference with closing the computer cover.

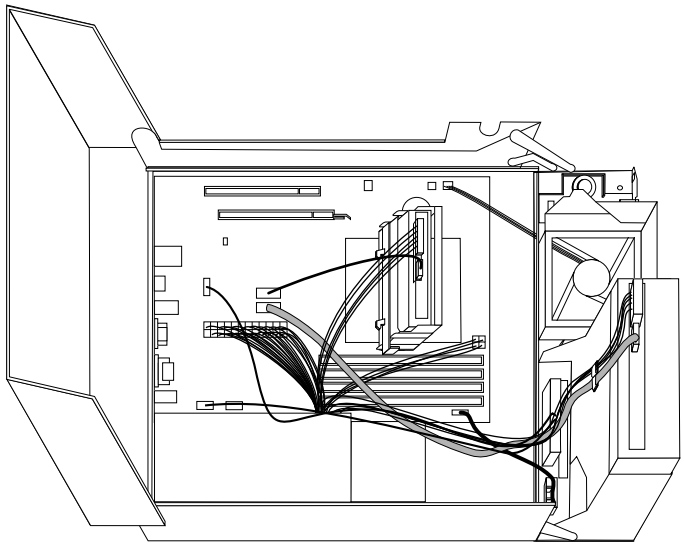


Figure 32. Cable routing

4. Lower the optical drive bay assembly.
5. Close the computer cover.
6. If there is an integrated cable lock available, lock the computer.
7. Reconnect the external cables and power cords to the computer. See “Locating connectors on the rear of your computer” on page 7.
8. To update your configuration, see Chapter 4 “Using the Setup Utility” on page 41.

Note: In most areas of the world, Lenovo requires the return of the defective Customer Replaceable Unit (CRU). Information about this will come with the CRU or will come a few days after the CRU arrives.

Obtaining device drivers

You can obtain device drivers for operating systems that are not preinstalled at http://www.lenovo.com/support. Installation instructions are provided in readme files with the device-driver files.

Installing security features

There are several security options available to help you prevent hardware theft and unauthorized access to your computer. In addition to physical locks, you can also prevent unauthorized use of your computer by a software lock that locks the keyboard until a correct password is typed in.

Note: Make sure that any security cables you installed do not interfere with other computer cables.

Integrated cable lock

An integrated cable lock, sometimes referred to as the Kensington lock, can be used to secure your computer to a desk, table, or other non-permanent fixture. The cable lock attaches to the integrated cable lock slot at the rear of your computer and is operated with a key. The cable lock also locks the buttons used to open the computer cover. This is the same type of lock used with many notebook computers. You can order an integrated cable lock directly from Lenovo by searching for *Kensington* at: http://www.lenovo.com/support

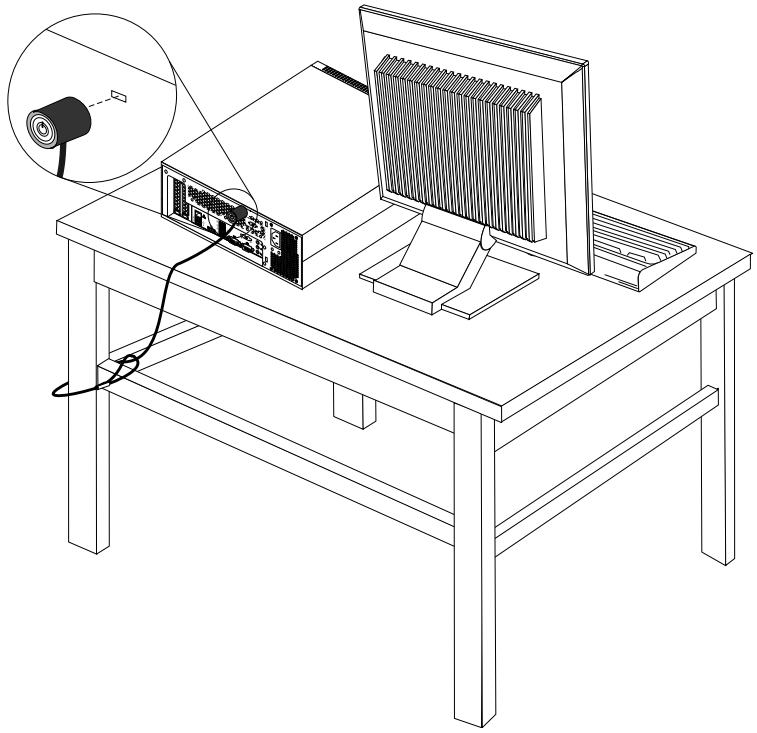


Figure 33. Integrated cable lock

Password protection

To deter unauthorized use of your computer, you can use the Setup Utility program to set a password. When you turn on your computer, you are prompted to type the password. The computer cannot be used until a valid password is typed in. Refer to Chapter 4 “Using the Setup Utility” on page 41 for more information.

Erasing lost or forgotten passwords (clearing CMOS)

This section provides instructions on how to erase lost or forgotten passwords, such as a user password.

To erase a lost or forgotten password, do the following:

1. Remove all media from the drives and turn off all attached devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Locate the Clear CMOS /Recovery jumper on the system board. See “Locating parts on the system board” on page 9.
4. Move the jumper from the standard position (pin 1 and pin 2) to the maintenance position (pin 2 and pin 3).
5. Close the computer cover and connect the power cord. See “Completing the parts replacement” on page 32.
6. Turn on the computer and leave it on for approximately 10 seconds. Then, turn off the computer by holding the power switch for approximately five seconds.
7. Repeat step 1 through step 2.
8. Move the Clear CMOS /Recovery jumper back to the standard position (pin 1 and pin 2).
9. Close the computer cover and connect the power cord. See “Completing the parts replacement” on page 32.

Chapter 3. Recovery information

This chapter provides information about the recovery solutions provided by Lenovo.

This chapter contains the following topics:

- Creating and using recovery media
- Performing backup and recovery operations
- Using the Rescue and Recovery workspace
- Creating and using a rescue medium
- Installing or reinstalling device drivers
- Solving recovery problems

Notes:

1. The recovery information in this chapter only applies to the computers that have a hard disk drive and preinstalled software from Lenovo.
2. There are a variety of methods to choose from when considering how to recover in the event of a software- or hardware-related problem. Some methods vary depending on the type of your operating system.
3. The product on the recovery media may be used only for the following purposes:
   - Restore the product preinstalled on your computer
   - Reinstall the product
   - Modify the product using the Additional Files

Creating and using recovery media

You can use recovery media to restore the hard disk drive to the factory default settings. Recovery media are useful if you transfer the computer to another area, sell the computer, recycle the computer, or put the computer in an operational state after all other methods of recovery have failed. As a precautionary measure, it is important to create recovery media as early as possible.

Note: The recovery operations you can perform using recovery media vary depending on the operating system from which the recovery media were created. The recovery media might contain a boot medium and a data medium. Your Microsoft Windows license permits you to create only one data medium, so it is important that you store the recovery media in a safe place after you have made them.

Creating recovery media

This section provides instructions on how to create recovery media on different operating systems.

Note: On the Windows 7 operating system, you can create recovery media using discs or external USB storage devices. On the Windows Vista operating systems, you can create recovery media using only discs, so this operation is also called “creating Product Recovery discs.”

- To create recovery media on the Windows 7 operating system, click **Start → All Programs → Lenovo ThinkVantage Tools → Factory Recovery Disks**. Then, follow the instructions on the screen.
- To create Product Recovery discs on the Windows Vista operating system, click **Start → All Programs → ThinkVantage → Create Product Recovery Media**. Then, follow the instructions on the screen.

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Using recovery media

This section provides instructions on how to use recovery media on different operating systems.

On the Windows 7 operating system and the Windows Vista operating system, you can use recovery media to restore the computer to the factory default settings only. You can use recovery media to put the computer in an operational state after all other methods of recovery have failed.

Attention: When you use recovery media to restore the computer to the factory default settings, all the files currently on the hard disk drive will be deleted and replaced by the factory default settings.

To use recovery media on the Windows 7 operating system or the Windows Vista operating system, do the following:

1. Depending on the type of your recovery media, connect the boot medium (memory key or other USB storage device) to the computer, or insert the boot disc into the optical drive.
2. Repeatedly press and release the F12 key when turning on the computer. When the Please select boot device window opens, release the F12 key.
3. Select the desired startup device and press Enter. The restore process begins.
4. Follow the instructions on the screen to complete the operation.

Notes:

1. After restoring your computer to the factory default settings, you might have to reinstall device drivers for some devices. See “Installing or reinstalling device drivers” on page 39.
2. Some computers come with Microsoft Office or Microsoft Works preinstalled. If you need to recover or reinstall your Microsoft Office or Microsoft Works applications, you must use the *Microsoft Office CD* or *Microsoft Works CD*. These discs are provided only with computers preinstalled with Microsoft Office or Microsoft Works.

Performing backup and recovery operations

The Rescue and Recovery program enables you to back up all your hard disk drive contents including the operating system, data files, software programs, and personal settings. You can designate where the Rescue and Recovery program stores the backup:

- In a protected area of your hard disk drive
- On the secondary hard disk drive if a secondary hard disk drive is installed in your computer
- On an attached external USB hard disk drive
- On a network drive
- On recordable discs (a recordable optical drive is required for this option)

After you have backed up the contents on the hard disk drive, you can restore the complete contents of the hard disk drive, restore only the selected files, or restore only the Windows operating system and applications.

Performing a backup operation

This section provides instructions on how to perform a backup operation using the Rescue and Recovery program on different operating systems.

- To perform a backup operation using the Rescue and Recovery program on the Windows 7 operating system, do the following:
  1. From the Windows desktop, click **Start → All Programs → Lenovo ThinkVantage Tools → Enhanced Backup and Restore**. The Rescue and Recovery program opens.

2. In the Rescue and Recovery main window, click the **Launch advanced Rescue and Recovery** arrow.
3. Click **Back up your hard drive** and select backup operation options. Then, follow the instructions on the screen to complete the backup operation.

- To perform a backup operation using the Rescue and Recovery program on the Windows Vista operating system, do the following:
  1. From the Windows desktop, click **Start → All Programs → ThinkVantage → Rescue and Recovery**. The Rescue and Recovery program opens.
  2. In the Rescue and Recovery main window, click **Launch advanced Rescue and Recovery → Back up your hard drive**, and select backup operation options.
  3. Follow the instructions on the screen to complete the backup operation.

Performing a recovery operation

This section provides instructions on how to perform a recovery operation using the Rescue and Recovery program on different operating systems.

- To perform a recovery operation using the Rescue and Recovery program on the Windows 7 operating system, do the following:
  1. From the Windows desktop, click **Start → All Programs → Lenovo ThinkVantage Tools → Enhanced Backup and Restore**. The Rescue and Recovery program opens.
  2. In the Rescue and Recovery main window, click the **Launch advanced Rescue and Recovery** arrow.
  3. Click the **Restore your system from a backup** icon.
  4. Follow the instructions on the screen to complete the recovery operation.
- To perform a recovery operation using the Rescue and Recovery program on the Windows Vista operating system, do the following:
  1. From the Windows desktop, click **Start → All Programs → ThinkVantage → Rescue and Recovery**. The Rescue and Recovery program opens.
  2. In the Rescue and Recovery main window, click **Launch advanced Rescue and Recovery**.
  3. Click the **Restore your system from a backup** icon.
  4. Follow the instructions on the screen to complete the recovery operation.

For more information about performing a recovery operation from the Rescue and Recovery workspace, see “Using the Rescue and Recovery workspace” on page 37.

Using the Rescue and Recovery workspace

The Rescue and Recovery workspace resides in a protected, hidden area of your hard disk drive that operates independently from the Windows operating system. This enables you to perform recovery operations even if you cannot start the Windows operating system. You can perform the following recovery operations from the Rescue and Recovery workspace:

- Rescue files from your hard disk drive or from a backup The Rescue and Recovery workspace enables you to locate files on your hard disk drive and transfer them to a network drive or other recordable media, such as a USB device or a disc. This solution is available even if you did not back up your files or if changes were made to the files since your last backup operation. You can also rescue individual files from a Rescue and Recovery backup located on your local hard disk drive, a USB device, or a network drive.
- Restore your hard disk drive from a Rescue and Recovery backup If you have backed up your hard disk drive using the Rescue and Recovery program, you can restore the hard disk drive from a Rescue and Recovery backup, even if you cannot start the Windows operating system.

- Restore your hard disk drive to the factory default settings The Rescue and Recovery workspace enables you to restore the complete contents of your hard disk drive to the factory default settings. If you have multiple partitions on your hard disk drive, you have the option to restore the factory default settings to the C: partition and leave the other partitions intact. Because the Rescue and Recovery workspace operates independently from the Windows operating system, you can restore the factory default settings even if you cannot start the Windows operating system.

Attention: If you restore the hard disk drive from a Rescue and Recovery backup or restore the hard disk drive to the factory default settings, all files on the primary hard disk drive partition (usually drive C:) will be deleted in the recovery process. If possible, make copies of important files. If you are unable to start the Windows operating system, you can use the rescue files feature of the Rescue and Recovery workspace to copy files from your hard disk drive to other media.

To start the Rescue and Recovery workspace, do the following:

1. Make sure the computer is turned off.
2. Repeatedly press and release the F11 key when turning on the computer. When you hear beeps or see a logo screen, release the F11 key.
3. If you have set a Rescue and Recovery password, type your password when prompted. The Rescue and Recovery workspace opens after a short delay.

   Note: If the Rescue and Recovery workspace fails to open, see “Solving recovery problems” on page 40.
4. Do one of the following:
   - To rescue files from your hard disk drive or from a backup, click **Rescue files** and follow the instructions on the screen.
   - To restore your hard disk drive from a Rescue and Recovery backup or to restore your hard disk drive to the factory default settings, click **Restore your system** and follow the instructions on the screen.

For more information about the features of the Rescue and Recovery workspace, click **Help**.

Notes:

1. After restoring your hard disk drive to the factory default settings, you might have to reinstall device drivers for some devices. See “Installing or reinstalling device drivers” on page 39.
2. Some computers come with Microsoft Office or Microsoft Works preinstalled. If you need to recover or reinstall your Microsoft Office or Microsoft Works applications, you must use the *Microsoft Office CD* or *Microsoft Works CD*. These discs are provided only with computers preinstalled with Microsoft Office or Microsoft Works.

Creating and using a rescue medium

With a rescue medium, such as a disc or a USB hard disk drive, you can recover the computer from failures that prevent you from gaining access to the Rescue and Recovery workspace on your hard disk drive.

Notes:

1. The recovery operations you can perform using a rescue medium vary depending on the operating system.
2. The rescue disc can be started in all types of optical drives.
3. You can also run the PC-Doctor for Rescue and Recovery diagnostic program, after using a rescue medium to recover the computer from failures and gaining access to the Rescue and Recovery workspace.

Creating a rescue medium

This section provides instructions on how to create a rescue medium on different operating systems.

- To create a rescue medium on the Windows 7 operating system, do the following:
  1. From the Windows desktop, click **Start → All Programs → Lenovo ThinkVantage Tools → Enhanced Backup and Restore**. The Rescue and Recovery program opens.
  2. In the Rescue and Recovery main window, click the **Launch advanced Rescue and Recovery** arrow.
  3. Click the **Create Rescue Media** icon. The Create Rescue and Recovery Media window opens.
  4. In the **Rescue Media** area, select the type of the rescue medium you want to create. You can create a rescue medium using a disc, a USB hard disk drive, or a secondary internal hard disk drive.
  5. Click **OK** and follow the instructions on the screen to create a rescue medium.
- To create a rescue medium on the Windows Vista operating system, do the following:
  1. From the Windows desktop, click **Start → All Programs → ThinkVantage → Create Recovery Media**. The Create Rescue and Recovery Media window opens.
  2. In the **Rescue Media** area, select the type of the rescue medium you want to create. You can create a rescue medium using a disc, a USB hard disk drive, or a secondary internal hard disk drive.
  3. Click **OK** and follow the instructions on the screen to create a rescue medium.

Using a rescue medium

This section provides instructions on how to use the rescue medium you have created.

- If you have created a rescue medium using a disc, use the following instructions to use the rescue medium:
  1. Turn off your computer.
  2. Repeatedly press and release the F12 key when turning on the computer. When the Please select boot device window opens, release the F12 key.
  3. In the Please select boot device window, select the desired optical drive as the first boot device. Then, insert the rescue disc into the optical drive and press Enter. The rescue medium starts.
- If you have created a rescue medium using a USB hard disk drive, use the following instructions to use the rescue medium:
  1. Attach the USB hard disk drive to one of the USB connectors on your computer.
  2. Repeatedly press and release the F12 key when turning on the computer. When the Please select boot device window opens, release the F12 key.
  3. In the Please select boot device window, select the USB hard disk drive as the first boot device and press Enter. The rescue medium starts.

When the rescue medium starts, the Rescue and Recovery workspace opens. The help information for each feature is available from the Rescue and Recovery workspace. Follow the instructions to complete the recovery process.

Installing or reinstalling device drivers

Before installing or reinstalling device drivers, make sure that you have a preinstalled operating system and the documentation and software media for the device.

Device drivers for factory-installed devices are located on the computer hard disk drive (usually drive C:) in the SWTOOLS\DRIVERS subdirectory. The latest device drivers for factory-installed devices are also available at http://www.lenovo.com/support. Other device drivers are on the software media that come with individual devices.

To install or reinstall the device driver for a factory-installed device, do the following:

1. Turn on the computer.

2. Use Windows Explorer or **My Computer** to display the directory structure of your hard disk drive.
3. Go to the C:\SWTOOLS directory.
4. Open the DRIVERS folder. Within the DRIVERS folder, there are several subfolders named for various devices installed in your computer, such as AUDIO or VIDEO.
5. Open the appropriate device subfolder.
6. Do one of the following:
   - In the device subfolder, look for a SETUP.exe file. Double-click the file and follow the instructions on the screen to complete the installation.
   - In the device subfolder, look for a README.txt file or a file with the .txt extension. This file might be named after the operating system, such as WIN98.txt. The TXT file contains information about how to install the device driver. Follow the instructions to complete the installation.
   - If the device subfolder contains a file with the .inf extension and you want to install the device driver using the INF file, refer to your Windows Help and Support information system for detailed information about how to install the device driver.

Solving recovery problems

If you are unable to access the Rescue and Recovery workspace or the Windows environment, do one of the following:

- Use a rescue medium to start the Rescue and Recovery workspace. See “Creating and using a rescue medium” on page 38.
- Use recovery media if all other methods of recovery have failed and you need to restore the hard disk drive to the factory default settings. See “Creating and using recovery media” on page 35.

Note: If you are unable to access the Rescue and Recovery workspace or the Windows environment from a rescue medium, a recovery repair diskette, or recovery media, you might not have the rescue device (an internal hard disk drive, a disc, a USB hard disk drive, or other external devices) set as the first boot device in the startup device sequence. You must first make sure that your rescue device is set as the first boot device in the startup device sequence in the Setup Utility program. See “Selecting a startup device” on page 43 for detailed information about temporarily or permanently changing the startup device sequence. For more information about the Setup Utility program, see Chapter 4 “Using the Setup Utility” on page 41.

It is important to create a rescue medium, a recovery repair diskette, and a set of recovery media as early as possible and store them in a safe place for future use.

Chapter 4. Using the Setup Utility

The Setup Utility program is used to view and change the configuration settings of your computer, regardless of which operating system you are using. However, the operating system settings might override any similar settings in the Setup Utility program.

Starting the Setup Utility program

To start the Setup Utility program, do the following:

1. Make sure your computer is turned off.
2. Repeatedly press and release the F1 key when turning on the computer. When you hear multiple beeps or see a logo screen, release the F1 key.

   Note: If a Power-On Password or an Administrator Password has been set, the Setup Utility program menu will not be displayed until you type the correct password. For more information, see “Using passwords” on page 41.

The Setup Utility program might start automatically when POST detects that hardware has been removed or new hardware has been installed in your computer.

Viewing and changing settings

The Setup Utility program menu lists various items about the system configuration. To view or change settings, start the Setup Utility program. See “Starting the Setup Utility program” on page 41. Then, follow the instructions on the screen.

When working with the Setup Utility program menu, you must use the keyboard. The keys used to perform various tasks are displayed at the bottom of each screen.

Using passwords

By using the Setup Utility program, you can set passwords to prevent unauthorized access to your computer and data. The following types of passwords are available:

- Power-On Password
- Administrator Password
- Hard Disk Password

You do not have to set any passwords to use your computer. However, using passwords improves computing security. If you decide to set any passwords, read the following sections.

Password considerations

A password can be any combination of up to 64 alphabetic and numeric characters. For security reasons, it is recommended to use a strong password that cannot be easily compromised. To set a strong password, use the following guidelines:

- Have at least eight characters in length
- Contain at least one alphabetic character and one numeric character
- Setup Utility program and hard disk drive passwords are not case sensitive

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- Not be your name or your user name
- Not be a common word or a common name
- Be significantly different from your previous passwords

Power-On Password

When a Power-On Password is set, you are prompted to type a valid password each time the computer is turned on. The computer cannot be used until the valid password is typed in.

Administrator Password

Setting an Administrator Password deters unauthorized users from changing configuration settings. If you are responsible for maintaining the configuration settings of several computers, you might want to set an Administrator Password.

When an Administrator Password is set, you are prompted to type a valid password each time you try to access the Setup Utility program. The Setup Utility program cannot be accessed until a valid password is typed in.

If both the Power-On Password and Administrator Password are set, you can type either password. However, you must use your Administrator Password to change any configuration settings.

Hard Disk Password

Setting a Hard Disk Password prevents unauthorized access to the data on the hard disk drive. When a Hard Disk Password is set, you are prompted to type a valid password each time you try to access the hard disk drive.

Setting, changing, and deleting a password

To set, change, or delete a password, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 41.
2. From the Setup Utility program main menu, select **Security**.
3. Depending on the password type, select **Set Power-On Password**, **Set Administrator Password**, or **Hard Disk Password**.
4. Follow the instructions on the right side of the screen to set, change, or delete a password.

   Note: A password can be any combination of up to 64 alphabetic and numeric characters. For more information, see “Password considerations” on page 41.

Enabling or disabling a device

This section provides information on how to enable or disable user access to the following devices:

USB Setup	Use this option to enable or disable a USB connector. When a USB connector is disabled, the device connected to the USB connector cannot be used.
SATA Controller	When this feature is set to **Disable**, all devices connected to the SATA connectors (such as hard disk drives or the optical drive) are disabled and cannot be accessed.
External SATA Port	When this option is set to **Disable**, the device connected to the External SATA connector cannot be accessed.

To enable or disable a device, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 41.

2. From the Setup Utility program main menu, select **Devices**.
3. Depending on the device you want to enable or disable, do one of the following:
   - Select **USB Setup** to enable or disable a USB device.
   - Select **ATA Drive Setup** to enable or disable an internal or external SATA device.
4. Select the desired settings and press Enter.
5. Press F10 to save and exit the Setup Utility program. See “Exiting from the Setup Utility program” on page 43.

Selecting a startup device

If your computer does not start up from a device such as the disc, diskette, or hard disk drive as expected, do one of the following to select the startup device you want.

Selecting a temporary startup device

Use this procedure to select a temporary startup device.

Note: Not all discs, hard disk drives, and diskettes are bootable.

1. Turn off your computer.
2. Repeatedly press and release the F12 key when turning on the computer. When the Please select boot device window displays, release the F12 key.
3. Select the desired startup device and press Enter. The computer will start up from the device you selected.

Note: Selecting a startup device from the Please select boot device window does not permanently change the startup sequence.

Selecting or changing the startup device sequence

To view or permanently change the configured startup device sequence, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 41.
2. From the Setup Utility program main menu, select **Startup**.
3. Select the devices for the Primary Startup Sequence, the Automatic Startup Sequence, and the Error Startup Sequence. Read the information displayed on the right side of the screen.
4. Press F10 to save and exit the Setup Utility program. See “Exiting from the Setup Utility program” on page 43.

Exiting from the Setup Utility program

After you finish viewing or changing settings, press Esc to return to the Setup Utility program main menu. You might have to press Esc several times. Do one of the following:

- If you want to save the new settings, press F10 to save and exit the Setup Utility program.
- If you do not want to save the settings, select **Exit → Discard Changes and Exit**.
- If you want to return to the default settings, press F9 to load the default settings.

Chapter 5. Updating system programs

This chapter provides information about updating the POST and BIOS, and how to recover from a POST and BIOS update failure.

Using system programs

System programs are the basic layer of software built into your computer. System programs include the POST, the BIOS, and the Setup Utility program. The POST is a set of tests and procedures that are performed each time you turn on your computer. The BIOS is a layer of software that translates instructions from other layers of software into electrical signals that the computer hardware can execute. You can use the Setup Utility program to view or change the configuration settings of your computer. See Chapter 4 “Using the Setup Utility” on page 41 for detailed information.

Your computer system board has a module called electrically erasable programmable read-only memory (EEPROM, also referred to as flash memory). You can easily update the POST, the BIOS, and the Setup Utility program by starting your computer with a system-program-update disc or running a special update program from your operating system.

Lenovo might make changes and enhancements to the POST and BIOS. When updates are released, they are available as downloadable files on the Lenovo Web site at http://www.lenovo.com. Instructions for using the POST and BIOS updates are available in a TXT file that is included with the update files. For most models, you can download either an update program to create a system-program-update disc or an update program that can be run from the operating system.

Updating (flashing) the BIOS from a disc

This section provides instructions on how to update (flash) the BIOS from a disc.

Note: You can download a self-starting bootable disc image (known as an ISO image) with the system program updates to create a system-program-update disc. Go to:
http://www.lenovo.com/support

To update (flash) the BIOS from a disc, do the following:

1. Turn off your computer.
2. Repeatedly press and release the F12 key when turning on the computer. When the **Startup Device Menu** opens, release the F12 key.
3. On the **Startup Device Menu**, select the desired optical drive as the startup device. Then, insert the disc into this optical drive and press Enter. The update begins.
4. When prompted to change the serial number, it is suggested that you do not make this change by pressing N. However, if you do want to change the serial number, press Y, then type in the serial number and press Enter.
5. When prompted to change the machine type and model, it is suggested that you do not make this change by pressing N. However, if you do want to change the machine type and model, press Y, then type in the machine type and model and press Enter.
6. Follow the instructions on the screen to complete the update. After the update is completed, remove the disc from the optical drive.

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Updating (flashing) the BIOS from your operating system

Note: Because Lenovo makes constant improvements to its Web sites, the Web page contents are subject to change without notice, including the contents referenced in the following procedure.

To update (flash) the BIOS from your operating system, do the following:

1. Go to http://www.lenovo.com/support.
2. Do the following to locate the downloadable files for your machine type:
   a. In the **Enter a product number** field, type your machine type and click **Go**.
   b. Click **Downloads and drivers**.
   c. Select **BIOS** from the **Refine results** drop-down list box to easily locate all the BIOS related links.
   d. Click the BIOS update link.
3. Click the TXT file that contains the instructions for updating (flashing) the BIOS from your operating system.
4. Print these instructions. This is very important because these instructions will not be displayed on the screen after the download begins.
5. Follow the printed instructions to download, extract, and install the update.

Recovering from a POST/BIOS update failure

If the power to your computer is interrupted while the POST and BIOS is being updated, your computer might not restart correctly. If this happens, perform the following procedure to recover from the POST and BIOS update failure. This procedure is commonly called Boot-block Recovery.

1. Remove all media from the drives and turn off all attached devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Open the computer cover. See “Opening the computer cover” on page 12.
3. Access the system board. See “Accessing the system board components and drives” on page 12.
4. Locate the Clear CMOS /Recovery jumper on the system board. See “Locating parts on the system board” on page 9.
5. Remove any cables that impede access to the Clear CMOS /Recovery jumper.
6. Move the jumper from the standard position (pin 1 and pin 2) to the maintenance position (pin 2 and pin 3).
7. Reconnect any cables that were disconnected and reinstall the hard disk drive if removed.
8. Close the computer cover and reconnect the power cords for the computer and monitor to electrical outlets. See “Completing the parts replacement” on page 32.
9. Turn on the computer and then insert the POST and BIOS update (flash update) disc into the optical drive. The recovery session begins. The recovery session will take two to three minutes. During this time, you will hear a series of beeps.
10. After the recovery session is completed, the series of beeps will end, and the system will automatically turn off. Remove the disc from the optical drive before the system completely turns off.
11. Repeat step 1 through step 4.
12. Move the Clear CMOS /Recovery jumper back to the standard position (pin 1 and pin 2).
13. Reconnect any cables that were disconnected and reinstall the hard disk drive if removed.
14. Close the computer cover and reconnect the power cords for the computer and monitor to electrical outlets. See “Completing the parts replacement” on page 32.
15. Turn on the computer to restart the operating system.

Chapter 6. Troubleshooting and diagnostics

This chapter describes some basic troubleshooting and diagnostic programs. If your computer problem is not described here, see Chapter 7 “Getting information, help, and service” on page 51 for additional troubleshooting resources.

Basic troubleshooting

The following table provides information to help you troubleshoot your computer problems.

Note: If you cannot correct the problem, have the computer serviced. For a list of service and support telephone numbers, refer to the *ThinkCentre Safety and Warranty Guide* that comes with your computer or go to the Lenovo Support Web site at http://www.lenovo.com/support/phone.

Symptom	Action
The computer does not start when you press the power switch.	Verify that: • The power cord is correctly connected to the rear of the computer and to a working electrical outlet. • If your computer has a secondary power switch on the rear of the computer, make sure that it is switched on. • The power indicator on the front of the computer is on. • The computer voltage matches the voltage available at the electrical outlet for your country or region.
The monitor screen is blank.	Verify that: • The monitor signal cable is correctly connected to the monitor and to the appropriate monitor connector on the computer. • The monitor power cord is correctly connected to the monitor and to a working electrical outlet. • The monitor is turned on and the brightness and contrast controls are set correctly. • The computer voltage matches the voltage available at the electrical outlet for your country or region. • If your computer has two monitor connectors, be sure to use the connector on the graphics card.
The keyboard does not work.	Verify that: • The computer is turned on. • The keyboard is securely connected to a USB connector on the computer. • No keys are stuck.
The mouse does not work.	Verify that: • The computer is turned on. • The mouse is securely connected to a USB connector on the computer. • The mouse is clean. Refer to “Cleaning an optical mouse” on page 50 for further information.

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Symptom	Action
The operating system does not start.	Verify that: • The startup sequence includes the device where the operating system resides. Usually, the operating system is on the hard disk drive. For more information, see “Selecting a startup device” on page 43. **Note:** For SMC computers, you might receive the error message “No operating system found. Press F1 to repeat boot sequence.” In this case, press Ctrl+Alt+Delete instead of F1 to establish a connection to the storage area network where your operating system is stored. Verify that the user name is not logged on in another location.
The SMC login prompt disappears before you log on and then a black screen displays (for SMC computers only).	Verify that your computer does not turn off due to inactivity. SMC will automatically turn off an inactive computer. If your computer turns off automatically, turn on the computer and log on. Contact your administrator if you cannot correct the problem.
The computer beeps multiple times before the operating system starts.	Verify that no keys are stuck.

Diagnostic programs

Diagnostic programs are used to test hardware components of your computer and report operating-system-controlled settings that can cause hardware failures. There are two programs preinstalled on your computer to help you diagnose computer problems:

- Lenovo ThinkVantage Toolbox (used when you are running the Windows operating system)
- PC-Doctor for Rescue and Recovery (used when your Windows operating system does not start)

Notes:

1. You can also download the PC-Doctor for DOS diagnostic program from http://www.lenovo.com/support. See “PC-Doctor for DOS” on page 49 for detailed information.
2. If you are unable to isolate and repair the problem yourself after running the diagnostic programs, save and print the log files created by the diagnostic programs. You will need the log files when you speak to a Lenovo technical support representative.

Lenovo ThinkVantage Toolbox

The Lenovo ThinkVantage Toolbox program helps you maintain your computer, improve computing security, diagnose computer problems, get familiar with the innovative technologies provided by Lenovo, and get more information about your computer. You can use the diagnostics feature of the Lenovo ThinkVantage Toolbox program to test devices, diagnose computer problems, create bootable diagnostic media, update system drivers, and view system information.

- To run the Lenovo ThinkVantage Toolbox program on the Windows 7 operating system, click **Start → All Programs → Lenovo ThinkVantage Tools → System Health and Diagnostics**. Follow the instructions on the screen.
- To run the Lenovo ThinkVantage Toolbox program on the Windows Vista operating system, click **Start → All Programs → ThinkVantage → Lenovo ThinkVantage Toolbox**. Follow the instructions on the screen.

Follow the instructions on the screen. For additional information, refer to the Lenovo ThinkVantage Toolbox help system.

PC-Doctor for Rescue and Recovery

The PC-Doctor for Rescue and Recovery diagnostic program is part of the Rescue and Recovery workspace on each Lenovo computer. Use the PC-Doctor for Rescue and Recovery diagnostic program if you are unable to start the Windows operating system.

To run the PC-Doctor for Rescue and Recovery diagnostic program from the Rescue and Recovery workspace, do the following:

1. Turn off the computer.
2. Repeatedly press and release the F11 key when turning on the computer. When you hear beeps or see a logo screen, stop pressing the F11 key. The Rescue and Recovery workspace opens after a short delay.
3. From the Rescue and Recovery workspace, select **Launch advanced Rescue and Recovery → Diagnose hardware**. The PC-Doctor for Rescue and Recovery diagnostic program opens.
4. Select the diagnostic test you want to run. Then, follow the instructions on the screen.

For additional information about running the PC-Doctor for Rescue and Recovery diagnostic program, refer to the PC-Doctor for Rescue and Recovery help system.

Note: If you encounter failures that prevent you from gaining access to the Rescue and Recovery workspace, you can run the PC-Doctor for Rescue and Recovery diagnostic program after using a rescue medium to recover the computer from failures and gaining access to the Rescue and Recovery workspace. See “Creating and using a rescue medium” on page 38.

PC-Doctor for DOS

You can also download the latest version of the PC-Doctor for DOS diagnostic program from http://www.lenovo.com/support. The PC-Doctor for DOS diagnostic program runs independently of the Windows operating system. Use the PC-Doctor for DOS diagnostic program if you are unable to start the Windows operating system or if the two diagnostic programs preinstalled on your computer have not been successful in isolating a possible problem. You can run the PC-Doctor for DOS diagnostic program from a diagnostic disc that you created.

Creating a diagnostic disc

This section provides instructions on how to create a diagnostic disc.

To create a diagnostic disc, do the following:

1. Download a self-starting bootable CD/DVD image (known as an ISO image) of the diagnostic program from:
   http://www.lenovo.com/support
2. Use any CD/DVD burning software to create a diagnostic disc with the ISO image.

Running the diagnostic program from a diagnostic disc

This section provides instructions on how to run the diagnostic program from a diagnostic disc that you created.

To run the diagnostic program from a diagnostic disc that you created, do the following:

1. Make sure the optical drive you want to use is set as the first boot device in the startup device sequence. See “Selecting a startup device” on page 43.
2. Make sure the computer is turned on and then insert the disc into the optical drive. The diagnostic program opens.

Note: You can insert the disc into the optical drive when you are setting the startup device sequence. However, if you insert the disc into the optical drive when you have already entered the operating system, you need to restart the computer to access the diagnostic program.

3. Follow the instructions on the screen to select the diagnostic test you want to run.

   Note: For additional help, press the F1 key.

4. Remove the diagnostic disc from the optical drive when you complete the diagnostic process.

Cleaning an optical mouse

This section provides instructions on how to clean an optical mouse.

An optical mouse uses a light-emitting diode (LED) and an optical sensor to navigate the pointer. If the pointer on the screen does not move smoothly with the optical mouse, you might need to clean the mouse.

To clean an optical mouse, do the following:

1. Turn off your computer.
2. Disconnect the mouse cable from the computer.
3. Turn the mouse upside down to check the lens.
   a. If there is a smudge on the lens, gently clean the area with a plain cotton-tipped swab.
   b. If there is debris in the lens, gently blow the debris away from the area.
4. Check the surface on which you are using the mouse. If you have a very intricate picture or pattern beneath the mouse, it may be difficult for the digital signal processor (DSP) to determine changes in the mouse position.
5. Reconnect the mouse cable to the computer.
6. Turn your computer back on.

Chapter 7. Getting information, help, and service

This chapter contains information about help, service, and technical assistance for products manufactured by Lenovo.

Information resources

You can use the information in this section to access useful resources relating to your computing needs.

Online Books folder

Note: The Online Books folder is only available on computers that have an internal hard disk drive and preinstalled software from Lenovo.

The Online Books folder preinstalled on your computer contains the *ThinkCentre User Guide*, which provides information about your computer to help you set up, use, and maintain your computer. It requires no Internet access to view the publication.

To view the publication, click **Start → All Programs → Online Books → Online Books**, then double-click the publication for your computer. The publication is also available on the Lenovo Support Web site at: http://www.lenovo.com/support

Notes:

1. The publication is in PDF version. To view the publication, you need to have the Adobe Reader program preinstalled on your computer. If the Adobe Reader program has not been installed on your computer, a message will be displayed when you attempt to view the PDF file and you will be guided through the Adobe Reader installation.
2. The publication is available in other languages on the Lenovo Support Web site at: http://www.lenovo.com/support
3. If you want to install a different language version of the Adobe Reader program rather than the version preinstalled on your computer, download the desired language version from the Adobe Web site at: http://www.adobe.com

Lenovo ThinkVantage Tools

The Lenovo ThinkVantage Tools program guides you to a host of information sources and provides easy access to various tools to help you work more easily and securely.

Note: The Lenovo ThinkVantage Tools program is only available on computers that have an internal hard disk drive, a Windows 7 operating system, and preinstalled software programs from Lenovo.

To access the Lenovo ThinkVantage Tools program, click **Start → All Programs → Lenovo ThinkVantage Tools**.

ThinkVantage Productivity Center

The ThinkVantage Productivity Center program contains information sources and tools designed to make computing easy and secure. It provides easy access to various technologies, such as:

- Client Security Solution
- Power Manager
- Productivity Center

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- Product Recovery
- Rescue and Recovery
- System Update

Note: The ThinkVantage Productivity Center program is only available on computers that have an internal hard disk drive, a preinstalled Windows Vista operating system, and preinstalled software programs from Lenovo.

To access the ThinkVantage Productivity Center program, click **Start → All Programs → ThinkVantage → Productivity Center**.

Lenovo Welcome

The Lenovo Welcome program introduces you to some innovative built-in features of Lenovo and guides you through a few important setup tasks to help you make the most of your computer.

Note: The Lenovo Welcome program is only available on computers that have an internal hard disk drive, a preinstalled Windows 7 or Windows Vista operating system, and preinstalled software programs from Lenovo.

Access Help

The Access Help information system provides information about getting started, doing basic tasks, customizing settings for your personal preference, protecting data, expanding and upgrading, and troubleshooting.

Note: The Access Help information system is only available on computers that have an internal hard disk drive and preinstalled software from Lenovo.

- To open the Access Help information system on the Windows 7 operating system, click **Start → Help and Support → Lenovo Access Help**.
- To open the Access Help information system on the Windows Vista operating system, click **Start → All Programs → ThinkVantage → Access Help**.

After you have opened the Access Help information system, use the left panel to make a selection from the **Contents** tab or the **Index** tab, or use the **Search** tab to find a particular word or phrase.

Safety and Warranty

The *ThinkCentre Safety and Warranty Guide* that is provided with your computer contains information on safety, setup, warranty, and notices. Read and understand all safety information before using this product.

Lenovo Web site (http://www.lenovo.com)

The Lenovo Web site provides up-to-date information and services to help you buy, upgrade, and maintain your computer. You can also do the following:

- Shop for desktop and notebook computers, monitors, projectors, upgrades and accessories for your computer, and special offers.
- Purchase additional services, such as support for hardware, operating systems, application programs, network setup and configuration, and custom installations.
- Purchase upgrades and extended hardware repair services.
- Download the latest device drivers and software updates for your computer model.
- Access the online manuals for your products.
- Access the Lenovo Limited Warranty.

- Access troubleshooting and support information for your computer model and other supported products.
- Find the service and support phone numbers for your country or region.
- Find a Service Provider located near you.

Help and service

This section contains information about obtaining help and service.

Using the documentation and diagnostic programs

If you experience a problem with your computer, see Chapter 6 “Troubleshooting and diagnostics” on page 47. For information on additional resources to help you troubleshoot your computer problem, see “Information resources” on page 51.

If you suspect a software problem, see the documentation that comes with the operating system or software program, including readme files and online help.

Most computers come with a set of diagnostic programs that help you identify hardware problems. For instructions on using the diagnostic programs, see “Diagnostic programs” on page 48.

You can also get the latest technical information and download device drivers and updates from Lenovo Support Web site at:
http://www.lenovo.com/support

Calling for service

During the warranty period, you can get help and information by telephone through the Customer Support Center.

The following services are available during the warranty period:

- **Problem determination** - Trained service personnel are available to assist you with determining a hardware problem and deciding what action is necessary to fix the problem.
- **Hardware repair** - If the problem is caused by hardware under warranty, trained service personnel are available to provide the applicable level of service.
- **Engineering Change management** - There might be changes that are required after a product has been sold. Lenovo or your reseller will make selected Engineering Changes (ECs) that apply to your hardware available.

These items are not covered by the warranty:
- Replacement or use of parts not manufactured for or by Lenovo or non-warranted Lenovo parts
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to the *ThinkCentre Safety and Warranty Guide* that comes with your computer for a complete explanation of warranty terms. You must retain your proof of purchase to obtain warranty service.

For a list of the Lenovo Support phone numbers for your country or region, go to http://www.lenovo.com/support/phone or refer to the *ThinkCentre Safety and Warranty Guide* that comes with your computer.

Note: Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

If possible, be at your computer when you call. Have the following information available:

- Machine type and model
- Serial numbers of your hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

Using other services

If you travel with your computer or relocate it to a country where your desktop or notebook computer machine type is sold, your computer might be eligible for International Warranty Service, which automatically entitles you to obtain warranty service throughout the warranty period. Service will be performed by service providers authorized to perform warranty service.

Service methods and procedures vary by country, and some services might not be available in all countries. International Warranty Service is delivered through the method of service (such as depot, carry-in, or on-site service) that is provided in the servicing country. Service centers in certain countries might not be able to service all models of a particular machine type. In some countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty Service and to view a list of the countries where service is available, go to http://www.lenovo.com/support, click **Warranty**, and follow the instructions on the screen.

For technical assistance with the installation of or questions related to Service Packs for your preinstalled Microsoft Windows product, refer to the Microsoft Product Support Services Web site at http://support.microsoft.com/directory or you can contact the Customer Support Center. Some fees might apply.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country or region. For more information about these services, go to the Lenovo Web site at: http://www.lenovo.com

Appendix A. Notices

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Television output notice

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